

DEC 1936 AMAZING STORIES

Bob Olsen
John W. Campbell, Jr.

AMAZING STORIES

December 1936
25 Cents



The SPACE MARINES and the SLAVERS
by BOB OLSEN

JOHN W. CAMPBELL, JR. EDMOND HAMILTON



Often a bridesmaid but never a bride

EDNA'S case was really a pathetic one. Like every woman, her primary ambition was to marry. Most of the girls of her set were married—or about to be. Yet not one possessed more grace or charm or loveliness than she.

And as her birthdays crept gradually toward that tragic thirty-mark, marriage seemed farther from her life than ever.

She was often a bridesmaid but never a bride.

* * *

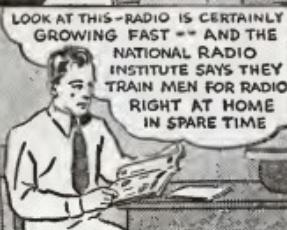
That's the insidious thing about halitosis (unpleasant

breath). You, yourself, rarely know when you have it. And even your closest friends won't tell you.

Sometimes, of course, halitosis comes from some deep-seated organic disorder that requires professional advice. But usually—and fortunately—halitosis is only a local condition that yields to the regular use of Listerine as a mouth wash and gargle. It is an interesting thing that this well-known antiseptic that has been in use for years for surgical dressings, possesses these unusual properties as a breath deodorant.

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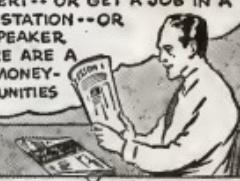
HOW A FREE LESSON STARTED BILL ON THE WAY TO A GOOD RADIO JOB



J. E. SMITH, President
National Radio Institute

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National Radio Institute, Dept. SMM, Washington, D. C.



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National Radio Institute, Dept. SMM, Washington, D. C.

Dear Mr. Smith: Without obligating me, send "Rich Rewards in Radio," which points out the spare time and full time opportunities in Radio and explains your 50-50 method of training men at home in spare time to become Radio Experts. (Please Write Plainly.)

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MAIL THIS NOW

AMAZING STORIES

Science Fiction

Vol. 10

DECEMBER, 1936

No. 13

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Cover and Illustrations by Morey

Our Cover depicts a scene from "The Space Marines and the Slavers"

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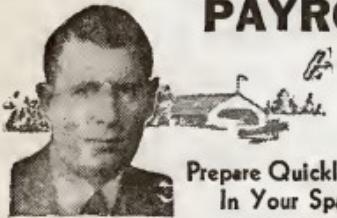
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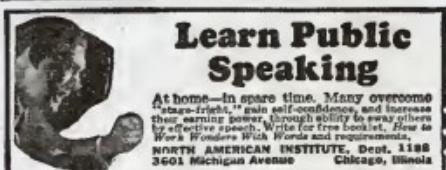
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T. O'CONOR SLOANE, Ph.D., *Editor*
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Extravagant Fiction To-day Cold Fact To-morrow

Astrology

By T. O'CONOR SLOANE, Ph.D.

MAN has had from the earliest times, the longing to peer into the future. This desire has existed for hundreds of centuries. In the poems of Homer we read of omens, based often on the flight of birds and on the examination of the entrails of sacrificed animals. This was not uneconomical for when through with the augury, the warriors feasted on the remains. If an eagle flew by, an augury of success or failure was at once deduced from its flight. Coming down to more recent times we have famous shrines of Apollo or Diana. All this we now consider very foolish and an indication of an ancient superstition. But some consideration is due to this criticism by twentieth century intellectuality. This consideration touches on present day astrology every bit as silly as the old-time predictions.

One of the leading dailies of the United States for a considerable pe-

riod recently, published articles on what the stars are saying. The prophesies included what the year is likely to be and what would be the fate of the person born on the day, all of which was exquisitely ridiculous. It would seem natural to use the matter published in such a paper for the information of its great circle of readers as a criterion of the intelligence of a certain proportion of such people. If stars are telling us anything it must be told in a pretty loud voice and the sound waves must move with many times the velocity of light. This is a sort of a *reductio ad absurdum*. Or if it be taken that the telling is visual and communicated by light waves, years would be required for the voice of the stars to be brought to us. The waves of wireless messages move by the ether and it would require years for them to traverse the distance intervening between the earth and the nearest star.

The publication of articles on astrology and purporting to give its predictions goes to show that there must be a somewhat widespread belief in its powers. It is entirely fallacious; there is not an iota of truth in the assertions of its prophetic powers. The fact that two of the planets are in conjunction is a purely natural and physical phenomenon and is not indicative of any prospective happenings in human affairs on this earth we inhabit. Astronomical phenomena tell us nothing about future doings on the earth. No possible relationship can be traced. Yet there is widespread belief in astrology, in the power of predicting the future by the relations of stars and planets in positions one with another.

The number of books which have been written on the subject is quite extensive, and there is much to be told of its history. It is absolutely astonishing how many men of the highest standing in past ages believed in it. The records of this belief take in many of the most distinguished men of olden times. It would be most interesting to know how many of the present age, which we call enlightened, believe in its prophetic powers. If there were any truth in its claims it would be an easy matter to get rich. There must be many who trust in its foretelling. And how useful would the knowledge of the future be for us. For it would be a necessary implication of a knowledge of the future, that everything is arranged and fixed for futurity, so that we could not change it. If we knew that we were to be favored by fate, if we trusted in the prognostications of astrology, the sequence of it all would be that we could not change the future, so what would be the use of making any provision for it? This is a sort of side

issue, however; the fact at the base of attempts to foretell the events of the future must logically be their inevitability, for this is the issue involving their veracity. If we are told just what is to happen, we should logically cease from all endeavoring. We should let events take their own course. And a successful career certainly will be due to personal work and ability, while astrology, if followed, would eliminate the personal element.

In the works of Herodotus, who has been entitled "the father of history," we are told of the old Greek oracles, shrines where fortune-tellers had their habitat and who were consulted by the highest personalities, kings and commanders of armies, who sought the guidance of alleged fortune tellers, to affect their future conduct. Old Herodotus gives several instances of the predictions of famous shrines as given out by the diviners, as they were looked upon. The feature which is brought out in many versions of the predictions is their ambiguity. The oracles had no desire to do anything to impair faith in their work, as that would of course affect them unfavorably. They were paid for their predictions. So in some instances, given by the historian, ambiguity appears quite ingeniously brought out. The language of the oracle's message is capable of two interpretations, so that whatever happened, it would appear that the foretelling was correct. It was a cleverly managed business. Such famous shrines as the Oracle of Delphi were paid liberally for their disclosures, these being ambiguous were no revelations whatever. The ambiguity often was quite humorous for those who did not take the words seriously to such an extent as to miss the double meaning.

Divination of the future was sought

for in older times by the attempt at interpreting the simplest natural things as disclosing things to come. The flight of birds, as already alluded to, is often introduced in Homer's poems, the Iliad and the Odyssey. The composing of these poems, which some claim to have preceded their writing, and to have been recited from memory, goes nearly three thousand years back from the present time.

But astrology, which is largely contemporaneous with astronomy of serious nature, figures as a sort of "twin sister" * * * "a swart, sour visaged maid" as Coleridge might lend us his words, for it has followed astronomy up to rather surprisingly recent times. Astrology still exists. Any number of people believe in it, but it is fair to say that any relationship with the science of astronomy was severed long ago. It is certainly a great enough triumph of astronomy to determine the distance of planets and stars, to apply spectroscopy to find how fast they are moving through space directly towards us or away from us by Doppler's principle, as the case may be, to determine what elements are in them, what their temperature is, how great is their mass, this range of work gives us enough to wonder at, if we have not lost the faculty of astonishment. But to say that, because in their regular motions in their orbits, planets come in line with each other or with the earth, they tell us anything about the immediate future, whether business is to be good or bad, whether wars are imminent and similar things, all this is absurd. And this is so thoroughly disproved, both by reason and observations, that astrology should have been disproved long ago, and it is curious enough that many still uphold it.

A psychologist in a recent work on the subject of his profession puts the need of some form of belief in the spiritual very strongly in stating that agnosticism is an intellectual disease and faith even in such fallacies as numerology, astrology, phrenology and other cults, is better than no faith at all.

Astrology is supposed to be based on the movements and relative positions of celestial bodies. The nearest of these is millions of miles away, but the moon, within a more reasonable distance, seems not to interest the astrologers. Perhaps if there were several moons, they might be more interested, but in one sense of the word they cannot be called lunatics; this is because professional astrologers receive compensation for their predictions. But imagine how fertile a field, for prognostications, astrologers on Saturn or Jupiter would find in the various moons of those planets.

There is one branch of predictional service which is based on a good practical foundation, and which is maintained by governments all over the world. This is the weather service. Innumerable stations are now established far and wide, in which observers report atmospheric conditions, such as temperature, barometric height, wind direction and velocity, rainfall and humidity and other factors of the atmospheric conditions. There are a great number of Weather Bureau Stations, as they are termed, all over the civilized area of the earth. Many observations are taken daily and self-registering instruments supplement personal readings. Based upon these observations an elaborate system of prognostications is made. Sometimes in abbreviated form, the daily papers are supposed to tell the readers whether it is going to be a day

for umbrellas or waterproofs. This is a personal service of no vital importance for the individual, failing over and over again in accurate or even approximately accurate statements of the future.

The scope of the services of the Weather Bureau is constantly expanding, but at first it was mostly for the individual. Then the agriculturists began to take cognizance of it and shipping received warning of danger from storms and of general wind conditions. And with the rapid development of air-travel the service has acquired a new and unanticipated importance in the securing of reliable predictions, or better expressed, prognostications of weather for the use of airplane and dirigible travel.

The astrologers are supposed to work with planets and constellations, millions and millions of miles distant. The Weather Bureau, in evolving its predictions simply take things as they are in our immediate vicinity and try to tell what is going to happen within the next twenty-four hours. They are right some times and wrong other times. Yet they really do a great service to navigation especially. It is in the weather service that we find prognostications even accurate or reasonably so, for a few days in the future, while in the futile attempts, if they are worth being so called, of the astrologers, we get nothing but what should be definitely considered anticipated absurdities. It is true that they study the effects of sun spots, but that is in no astrological sense. It is really the physical effects

of the light and heat of the sun and its stratosphere.

Suppose one cuts a forked V-shaped branch from a living bush. It must be flexible and at the ends somewhat thinner than a lead pencil. Eight or ten inches is a good length for the two limbs. Now hold it in the two hands by the ends, one end in the right and one in the left hand, the thumbs holding it down against the forefingers. It will project horizontally from the body. Hold it over a bucket of water and see if anything happens. There will be not the slightest change. Yet this is the famous divining-rod, which has been used over and over again to indicate a place where a well should be dug.

By holding it in a particular way, bending the ends outwards in the hands, the least twist given by them will make the ends rise and fall, rapidly or slowly, moving mysteriously, because observers look only at the apex of the fork and do not notice the slight bending of the ends between the operator's thumbs and fingers. They never dream that he moves his fingers.

The divining-rod is an old superstition. It has been used for centuries for exploring the depths of the earth in search of water for a well, and today many people believe in it. It has been investigated by supposedly intelligent people, but the puzzle remains. Why did the investigators not try to use the rod themselves?

It provides an excellent supplement to what has been said of astrology.



Uncertainty

By JOHN W. CAMPBELL, JR.

This concludes Mr. Campbell's story, which we were glad to procure for our readers. The vivid preceding installment leads to an ending which, we are sure, will impress our readers.

CHAPTER VII

CONCLUSION

GRESTH GKAE looked back at Sthor rapidly dropping behind, and across at her sister world, Asthor, circling a bare 100,000 miles away. Behind his great interstellar cruiser came a long line of similar ships. Each was loaded now not with instruments and pure scientists, but with weapons, fuel and warriors. Colonists too, came in the last ships. One hundred and fifty giant ships. All the wealth of Sthor and Asthor had been concentrated in producing those great machines. Every one represented nearly the equivalent of thirty million earth-dollars. Four and a half billions of dollars for mere materials.

Gresth Gkae had the honor of lead position, for he had discovered the planets and their stable, though tiny, sun. Still, Gresth Gkae knew his own giant Mira was a super-giant sun—and a curse and a menace to any rational society. Our yellow-white sun (to his eyes, an almost invisible color, similar to our blue) was small, but stable, and warm enough.

In half an hour, all the ships were in space, and at a given signal, at ten second intervals, they sprang into the superspeed, faster than light. For an instant, giant Mira ran and seemed

distorted, as though seen through a port hole covered with running water, then steadied, curiously distorted. Faster than light, they raced across the galaxy.

Even in their super-fast ships, nearly three and a half weeks passed before the sun they sought, singled itself from the star-field as an extra bright point. Two days more, and the sun was within planetary distance. They came at an angle to the plane of the ecliptic, but they leveled down to it now, and slanted toward giant Jupiter and Jovian worlds. Ten worlds, in one sweep, it was—four habitable worlds. The nine satellites would be converted into forts at once, nine space-sweeping forts guarding the approaches to the planet. Gresth Gkae had made a fairly good search of the worlds, and knew that earth was the main home of civilization in this system. Mars was second, and Venus third. But Jupiter offered the greatest possibilities for quick settlement, a base from which they could more easily operate, a base for fuels, for the heavy elements they would need—

Fifteen million miles from Jupiter they slowed below the speed of light—and the IP stations observed them. Instantly, according to instructions issued by Commander McLaurin, a fleet of ten of the tiniest, fastest



Instantly, according to instructions issued by Commander McLaurin, a fleet of ten of the tiniest, fastest scouts darted out.

scouts darted out. As soon as possible, a group of three heavy cruisers, armed with all the inventions that had been discovered, the atostor power system, perfectly conducting power leads, the terrible UV ray, started out.

The scouts got there first. Cameras were grinding steadily, with long range telescopic lenses, delicate instruments probed and felt and caught their fingers in the fields of the giant fleet.

At ten second intervals, giant ships popped into being, and glided smoothly toward Jupiter.

Then the cruisers arrived. They halted at a respectful distance, and waited. The Miran ships plowed on undisturbed. Simultaneously, from the three leaders, terrific neutron rays shot out. The paraffine-block walls stopped those—and the cruisers started to explain their feelings on the subject. They were the IP-J-37, 39, and 42. The 37 turned up the full power of the UV ray. The terrific beam of ultra-violet energy struck the second Miran ship, and the spot it touched exploded into incandescence, burned white-hot—and puffed out abruptly as the air pressure within blew the molten metal away.

The Mirans were startled. This was not the type of thing Gresth Gkae had warned them of. Gresth Gkae himself frowned as the sudden roar of the machines of his ship rose in the metal walls. A stream of ten-inch atomic bombs shrieked out of their tubes, dully glowing green things floated out more slowly, and immediately waxed brilliant. Gamma ray bombs—but they could be guarded against—

The three Solarian cruisers were washed in such frightful flame as

they had never imagined. Streams of atomic bombs were exploding soundlessly, ineffectively in space, not thirty feet from them as they felt the sudden resistance of the magnetic shields. Hopefully, the 39 probed with her neutron gun. Nothing happened save that several gamma ray bombs went off explosively, and all the atomic bombs in its path exploded at once.

GRESTH GKAE knew what that meant. Neutron beam guns. Then this race was more intelligent than he had believed. They had not had them before. Had he perhaps given them too much warning and information?

There was a sudden, deeper note in the thrumming roar of the great ship. Eagerly Gresth Gkae watched—and sighed in relief. The nearer of the three enemy ships was crumbling to dust. Now the other two were beginning to become blurred of outline. They were fleeing—but oh, so slowly. Easily the greater ship chased them down, till only floating dust, and a few small pieces of—

Gresth Gkae shrieked in pain, and horror. The destroyed ships had fought in dying. All space seemed to blossom out with a terrible light, a light that wrapped around them, and burned into him, and through him. His eyes were dark and burning lumps in his head, his flesh seemed crawling, stinging—he was being flayed alive—in shrieking agony he crumpled to the floor.

Hospital attachés came to him, and injected drugs. Slowly torturing consciousness left him. The doctors began working over his horribly burned body, shuddering inwardly as the protective, feather-like covering of his skin loosened, and dropped from his

body. Tenderly they lowered him into a bath of chemicals—

"The terrible light which caused so much damage to our men," reported a physicist, "was analyzed, and found to have some extraordinary lines. It was largely mercury-vapor spectrum, but the spectrum of mercury-atoms in an impossibly strained condition. I would suggest that great care be used hereafter, and all men be equipped with protective masks when observations are needed. This sun is very rich in the infra-X-rays and ultra-visible light. The explosion of light, we witnessed, was dangerous in its consisting almost wholly of very short and hard infra-X-rays."

The physicist had a special term for what we know as ultra-violet light. To him, blue was ultra-violet, and exceedingly dangerous to red-sensitive eyes. To him, our ultra-violet was a long X-ray, and was designated by a special term. And to him—the explosion of the atostor reservoirs was a terrible and mystifying calamity.

To the men in the five tiny scout-ships, it was also a surprise, and a painful one. Even space-hardened humans were burned by the terrifically hard ultra-violet from the explosion. But they got some hint of what it had meant to the Mirans from the confusion that resulted in the fleet. Several of the nearer ships spun, twisted, and went erratically off their courses. All seemed uncontrolled momentarily.

The five scouts, following orders, darted instantly toward the Lunar Bank. Why, they did not know. But those were orders. They were to land there.

The reason was that, faster than any solarian ship, radio signals had reached McLaurin, and he, and most

of the staff of the IP service had been moved to the Lunar Bank. Buck Kendall had extended an invitation in this "unexpected emergency." It so happened that Buck Kendall's invitation got there before any description of the strangers, or their actions had arrived. The staff was somewhat puzzled as to how this happened—

And now for the satellites of great Jupiter.

One hundred and fifty giant interstellar cruisers advanced on Callisto. They didn't pause to investigate the mines and scattered farms of the satellite, but ten great ships settled, and a horde of warriors began pouring out.

One hundred and forty ships reached Ganymede. One hundred and thirty sailed on. One hundred and thirty ships reached Europa—and they sailed on hurriedly, one hundred and twenty-nine of them. Grest Gkae did not know it then, but the fleet had lost its first ship. The IP station on Europa had spoken back,

They sailed in, a mighty armada, and the first dropped through Europa's thin, frozen atmosphere. They spotted the dome of the station, and a neutron ray lashed out at it. On the other, undefended worlds, this had been effective. Here—it was answered by ten five-foot UV rays. Further, these men had learned something from the destruction of the cruisers, and ten torpedos had been unloaded, reloaded with atostor mercury, and sent out bravely.

Easily the Mirans wiped out the first torpedo—

Shrieking, the Miran pilots clawed their way from the controls as the fearful flood of ultra-violet light struck their unaccustomed skins. Others too felt that burning flood.

The second torpedo they caught

and deflected on a beam of alternating-current magnetism that repelled it. It did not come nearer than half a mile to the ship. The third they turned their deflecting beam on—and something went strangely wrong with the beam. It pulled that torpedo toward the ship with a sickening acceleration—and the torpedo exploded in that frightful violet flame.

FIVE-FOOT diameter UV beams are nothing to play with. The Mirans were dodging these now as they loosed atomic bombs, only to see them exploded harmlessly by neutron guns, or caught in the magnetic screen. Gamma ray bombs were as useless. Again the beam of disintegrating force was turned on—

The present opponent was not a ship. It was an IP defense station, equipped with everything Solarian science knew, and the dome was an eight foot wall of tungsto-beryllium. The eight feet of solid, ultra-resistant alloy drank up that crumbling beam, and liked it. The wall did not fail. The men inside the fort jerked and quivered as the strange beam, a small, small fraction of it, penetrated the eight feet of outer wall, the six feet or so of intervening walls, and the mercury atostor reserves.

"Concentrate all those UV beams on one spot, and see if you can blast a hole in him before he shakes it loose," ordered the ray technician. "He'll wiggle if you start off with the beam. Train your sights on the nose of that first ship—when you're ready, call out."

"Ready—ready—" Ten men replied. "Fire!" roared the technician. Ten titanic swords of pure ultraviolet energy, energy that practically no unconditioned metal will reflect to more than fifty per cent, emerged.

There was a single spot of intense incandescence for a single hundredth of a second—and then the energy was burning its way through the inner, thinner skins with such rapidity that they sputtered and flickered like a broken televiser.

One hundred and twenty-nine ships retreated hastily for conference, leaving a gutted, wrecked hull, broken by its fall, on Europa. Triumphantly, the Europa IP station hurled out its radio message of the first encounter between a fort and the Miran forces.

Most important of all, it sent a great deal of badly wanted information regarding the Miran weapons. Particularly interesting was the fact that it had withstood the impact of that disintegrating ray.

CHAPTER VIII

GRIMLY Buck Kendall looked at the reports. McLaurin stood beside him, Devin sat across the table from him. "What do you make of it, Buck?" asked the Commander.

"That we have just one island of resistance left on the Jovian worlds. And that will, I fear vanish. They haven't finished with their arsenal by any means."

"But what was it, man, what was it that ruined those ships?"

"Vibration. Somehow—Lord only knows how it's done—they can project electric fields. These projected fields are oscillated, and they are tuned in with some parts of the ship. I suspect they are crystals of the metals. If they can start a vibration in the crystals of the metal—that's fatigue, metal fatigue enormously speeded. You know how a quartz crystal oscillator in a radio-control

apparatus will break, if you work it on a very heavy load at the peak? They simply smash the crystals of metal in the same way. Only they protect their field."

"Then our toughest metals are useless? Can't something tough, rather than hard, like copper or even silver for instance, stand it?"

"Calcium metal's the toughest going—and even that would break under the beating those ships give it. The only way to withstand it is to have such a mass of metal that the oscillations are damped out. But—"

The set tuned in on the IP station on Europa was speaking again. "The ships are returning. There are one hundred and twenty-nine by accurate count. Jorgsen reports that telescopic observation of the dead on the fallen cruiser show them to be a *completely un-human race!* They are of mottled coloring, predominately greyish brown. The ships are returning. They have divided into ten groups, nine groups of two each, and a main body of the rest of the fleet. The group of eighteen is descending within range, and we are focusing our beams on them—"

Out by Europa, ten great UV beams were stabbing angrily toward ten great interstellar ships. The metal of the hulls glowed brilliant, and distorted slowly as the thick walls softened under the heat, and the air behind pressed against it. Grimly the ten ships came on. Torpedoes were being launched, and exploded, and now they had no effect, for the M irans within were protected.

The eighteen grouped ships separated, and arranged themselves in a circle around the fort. Suddenly one staggered as a great puff of gas shot out through the thin atmosphere of Europa to flare brilliantly in the lash

of the stabbing UV beam. Instantly the ship righted itself, and laboured upward. Another dropped to take its place—

And the great walls of the IP fort suddenly groaned and started in their welded joints. The faint, whispering rustle of the crumbling beam was murmuring through the station. Engineers shouted suddenly as meters leapt the length of their scales, and the needles clicked softly on the stoppins. A thin rustle came from the atostors grouped in the great power room. "Spirits of Space—a revolving magnetic field!" roared the Chief Technician. "They're making this whole blasted station a squirrel-cage!"

The mighty walls of eight-foot metal shuddered and trembled. The UV beams lashed out from the fort in quivering arcs now, they did not hold their aim steady, and the magnetic shield that protected them from atomic bombs was working and straining wildly. Eighteen great ships quivered and tugged outside there now, straining with all their power to remain in the same spot, as they passed on from one to another the magnetic impulses that were now creating a titanic magnetic vortex about the fort.

"The atostors will be exhausted in another fifteen minutes," the Chief Technician roared into his transmitter. "Can the siganls get through those fields, Comamnder?"

"No, Mac. They've been stopped, Sparks tells me. We're here—and let's hope we stay. What's happening?"

"They've got a revolving magnetic field out there that would spin a minor planet. The whole blasted fort is acting like the squirrel cage in an induction motor! They've made us the

armature in a five hundred million horsepower electric motor."

"They can't tear this place loose can they?"

"I don't know—it was never—" The Chief stopped. Outside a terrific roar and crash had built up. White darts of flame leapt a thousand feet into the air, hurling terrific masses of shattered rock and soil.

"I was going to say," the Chief went on, "this place wasn't designed for that sort of a strain. Our own magnetic field is supporting us now, preventing their magnetic field from getting its teeth on metal. When the strain comes—well, they're cutting loose our foundation with atomic bombs!"

FIVE UV beams were combined on one interstellar ship. Instantly the great machine retreated, and another dropped in to take its place while the magnetic field spun on, uninterrupted.

"Can they keep that up long?"

"God knows—but they have a hundred and more ships to send in when the power of one gives out, remember?"

"What's our reserve now?"

The Chief paused a moment to look at the meters. "Half what it was ten minutes ago!"

Commander Wallace sent some other orders. Every torpedo tube of the station suddenly belched forth deadly, fifteen-foot torpedoes, most of them mud-torpedoes, torpedoes loaded with high explosive in the nose, a delayed fuse, and a load of soft clinging mud in the rear. The mud would flow down over the nose and offer a resistance foot-hold for the explosive which empty space would not. Four hundred and three torpedoes, equipped with anti-mag-

netic apparatus darted out. One hundred and four passed the struggling fields. One found lodgement on a Miran ship, and crushed in a metal wall, to be stopped by a bulkhead.

The Chief engineer watched his power declining. All ten UV beams were united in one now, driving a terrible sword of energy that made the attacked ship skip for safety instantly, yet the beams were all but useless. For the Miran reserves filled the gap, and the magnetic tornado continued.

For seventeen long minutes the station resisted the attack. Then the last of the strained mercury flowed into the receivers, and the vast power of the atostors was exhausted. Slowly the magnetic fields declined. The great walls of the station felt the clutching lines of force—they began to heat and to strain. A low, harsh grinding became audible over the roar of the atomic bombs. The whole structure trembled, and jumped slightly. The roar of bombs ceased suddenly, as the station jerked again, more violently. Then it turned a bit, rolled clumsily. Abruptly it began to spin violently, more and more rapidly. It started rolling clumsily across the plateau—

A rain of atomic bombs struck the unprotected metal, and the eighth breached the walls. The twentieth was the last. There was no longer an IP station on Europa.

"The difference," said Buck Kendall slowly, when the reports came in from scout-ships in space that had witnessed the last struggle, "between an atomic generator and an atomic powerstore, or accumulator, is clearly shown. We haven't an adequate source of power."

McLaurin sighed slowly, and rose to his feet. "What can we do?"

"Thank our lucky stars that Faragaut here, and I, bought up all the mercury in the system, and had it brought to earth. We at least have a supply of materials for the atostors.

"They don't seem to do much good."

"They're the best we've got. All the photocells on earth and Venus and Mercury are at present busy storing the sun's power in atostors. I have two thousand tons of charged mercury in our tanks here in the 'Lunar Bank'."

"Much good that will do—they can just pull and pull and pull till it's all gone. A star-fish isn't strong, but he can open the strongest oyster just because he can pull from now on. You may have a lot of power—but."

"But—we also have those new fifteen-foot UV beams. And one fifteen-foot UV beam is worth, theoretically, nine five-foot beams, and practically, a dozen. We have a dozen of them. Remember, this place was designed not only to protect itself, but earth too."

"They can still pull, can't they?"

"They'll stop pulling when they get their fingers burned. In the meantime, why not use some of those IP ships to bring in a few more cargoes of charged mercury?"

"They aren't good for much else, are they? I wonder if those fellows have anything more we don't know?"

"Oh, probably. I'm going to work on that crumbler thing. That's the first consideration now."

"Why?"

"So we can move a ship. As it is, even those two we built aren't any good."

"Would they be anyway?"

"Well—I think I might disturb those gentlemen slightly. Remember, they each have a nose-beam eighteen

feet across. Exceedingly unpleasant customers."

"Score: Strangers; magnetic field, atomic bombs, atomic power, crumbler ray. Home team; UV beams."

Kendall grinned. "I'd heard you were a pessimistic cuss when battle started—"

"Pessimistic, hell, I'm merely counting things up."

"McClellan had all the odds on Lee back in the Civil War of the States—but Lee sent him home faster than he came."

"But Lee lost in the end."

"Why bring that up? I've got work to do." Still smiling, Kendall went to the laboratory he had built up in the "Lunar Bank." Devin was already there, calculating. He looked unhappy.

"We can't do anything, as far as I can see. They're using an electric field all right, and projecting it: I can't see how we can do that."

"Neither can I," agreed Kendall, "so we can't use that weapon. I really didn't want to anyway. Like the neutron gun which I told Commander McLaurin would be useless as a weapon, they'd be prepared for it you can be sure. All I want to do is fight it, and make their projection useless."

"Well, we have to know how they project it before we can break up the projection, don't we?"

"Not at all. They're using an electric field of very high frequency, but variable frequency. As far as I can see, all we need is a similar variable electric field of a slightly different frequency to heterodyne theirs into something quite harmless."

"Oh," said Devin. "We could, couldn't we? But how are you going to do that?"

"We'll have to learn, that's all."

BUCK KENDALL started trying to learn. In the meantime, the Mirans were taking over Jupiter. There were three IP stations on the planet itself, but they were vastly hindered by the thick, almost ultra violet proof atmosphere of Jupiter. Their rays were weak. And the magnetic fields of the Mirans were unaffected. Only their atomic bombs were hindered by the heavier gravity that pulled the rocks back in place faster than the bombs could throw them out. Still—a few hours of work, and the IP stations on Jupiter had rolled wildly across the flat plains of the planet like dented cans, to end in utter destruction.

The Mirans had paid no attention to the fleeing passenger and freighter ships that left the planet, loaded to the utmost with human cargo, and absolutely no freight. The IP fleet had to go to their rescue with oxygen tanks to take care of the extra humans, but nearly three-quarters of the population of Jupiter, a newly-established population, and hence a readily mobile one, was saved. The others, the Mirans did not bother with particularly except when they happened to be near where the Mirans wanted to work. Then they were instantly destroyed by atomic bombing, or gamma rays.

The Mirans settled almost at once, and began their work of finding on Jupiter the badly needed atomic fuels. Machines were set up, and work begun, Mirans laboring under the gravity of the heavy planet. Then, fifty ships swam up again, reloaded with fuel, and with crews consisting solely of uninjured warriors, and started for Mars.

Mars was half way between her near conjunction and her maximum elongation with respect to Jupiter at

that time. The Mirans knew their business though, for they started in on the IP station on Phobos. They were practiced by this time, and this IP station had only seven five-foot beams. In half an hour that station fell, and its sister station on Diemos followed. Three wounded ships returned to Jupiter, and ten new ships came out. The attack on Mars itself was started.

Mars was a different proposition. There were thirty-two IP stations here, one of them nearly as powerful as the Lunar Bank station. It was equipped with four of the huge fifteen-foot beams. And it had fifteen tons of mercury, more than seven-eighths charged. The Mars Center Station was located a short ten miles from the Mars Center City, and under the immediate orders of the IP heads, Mars Center City had been vacated.

For two days the Mirans hung off Mars, solidifying their positions on Phobos and Diemos. Then, with sixty-two ships, they attacked. They had made some very astute observations, and they started on the smaller stations just beyond the range of the Mars Center Station. Naturally, near so powerful a center, these stations had never been strong. They fell rapidly. But they had been counted on by Mars Center as auxiliary supports. McLaurin had sent very definite orders to Mars Center forbidding any action on their part, save gathering of power-supplies.

At last the direct attack on Mars Center was launched. For the first time, the Mirans saw one of the fifteen-foot beams. Mars' atmosphere is thin, and there is little ozone. The ultra violet beams were nearly as effective as in empty space. When the Mirans dropped their ships, a full

thirty of them, into the circle formation, Mars Center answered at once. All four beams started.

Those fifteen-foot beams, connected directly to huge atostor release apparatus, delivered a maximum power of two and three-quarter billion horsepower, each. The first Miran ship struck, sparkled magnificently, and a terrific cascade of white-hot metal rolled down from its nose. The great ship nosed down and to the left abruptly, accelerated swiftly—and crashed with tremendous energy on the plain outside of Mars Center City. White, unwavering flames licked up suddenly, and made a column five hundred feet high against the dark sky. Then the wreck exploded with a violence that left a crater half a mile across.

Three other ships had been struck, and were rapidly retreating. Another try was made for the ring formation, and four more ships were wounded, and replaced. The ring did not retreat, but the great magnetic field started. Atomic and gamma ray bombs started now, flashing sometimes dangerously close to the station as its magnetic field battled the rotating field of the ships. The four greater beams, and many smaller ones were in swift and angry action. Not more than a ten second exposure could be endured by any one ship, before it must retreat.

FOR five minutes the Mirans hung doggedly at their task. Then, wisely, they retreated. Of the fleet, not more than seven ships remained untouched. Mars Center Station had held—at what cost only they knew. Five hundred tons of their mercury had been exhausted in that brief five minutes. One hundred tons a minute had flowed into and out of the atostor ap-

paratus. Mars Center radioed for help, when the fleet lifted.

There was one other station on Mars that stood a good chance of survival, Deenmor Station, with three of the big beams installed, and apparatus for their fourth was in the station, and being rapidly worked over. McLaurin did a wise and courageous thing, at which every man on Mars cursed. He ordered that all IP stations save these two be deserted, and all mercury fuel reserves be moved to Deenmor and Mars Center.

The Mirans could not land on the North Western section of Mars, nor in the South Central region. Therefore Mars was not exactly habitable to Miran ships, because the great beams had been so perfectly figured that they were effective at a range of nearly twelve hundred miles.

Deenmor station was attacked—but it was a half-hearted attack, for Mirans were becoming distinctly skittish about fifteen foot UV beams. Two badly blistered ships—and the Mirans retreated to Jupiter. But Mira held Phobos and Diemos. In two weeks, they had set up cannon there, and proved themselves accurate long-range gunners. Against the feeble attraction of Diemos, and with Mars' gravity to help them, they began bombarding the two stations, and anything that attempted to approach them, with gamma and atomic explosive bombs. Meanwhile they amused themselves occasionally by planting a gamma-ray bomb in each of Mars' major cities. They made Mars uninhabitable for Solarians as well as for Mirans, at least until the deadly slow-action atomic explosives wore off, or were removed.

Then the Mirans, after a lapse of three weeks while they dug in their toes on Jupiter, prepared to leap.

Earth was the next goal. Miran scoutships had been sent out before this—and severely handled by the concentrated fleets of the IP that hung grimly off Earth and Luna now. But the scouts had learned one thing. Mirans could never hope to attain a firm grasp on earth while terribly armed Luna hung like a Sword of Damocles over their heads. Further, attack on earth directly would be next to impossible, for, thanks to Faragaut's Interplanetary Company, nearly all the Mercury metal in the system was safely lodged on earth, and saturated with power. Every major city had been equipped with great UV apparatus. And neutron guns in plenty waited on small ships just outside the atmosphere to explode harmlessly any atomic or gamma bombs Miran ships might attempt to deposit.

An attack on Luna was the first step. But that terrible, gigantic fort on Luna worried them. Yet while that fort existed, earth ships were free to come and go, for Mirans could not afford to stand near. At a distance of twenty thousand miles, small Miran ships had felt the touch of those great UV beams.

Finally, a brief test-attack was made, with an entire fleet of one hundred ships. They drew almost into position, faster than light, faster than the signaling warnings could send their messages. In position, all those great ships strained and heaved at the mighty magnetic vortex that twisted at the field of the fort. Instantly, twelve of the fifteen-foot UV beams replied. And—two great UV beams of a size the Mirans had never seen before, beams from the two ships, "S Doradus" and "Cepheid."

The test-attack dissolved as suddenly as it had come. The Mirans returned to Jupiter, and to the outer

planets where they had further established themselves. Most of the Solar System was theirs. But the Solarians still held the choicest planets—and kept the Mirans from using the mild-temperatured Mars.

CHAPTER IX

THEY can't take this, at least," sighed McLaurin as they retreated from Luna.

"I didn't think they could—right away. I'm wondering though if they haven't something we haven't seen yet. Besides which—give them time, give them time."

"Well, give us time, too," snapped McLaurin. "How are you coming?"

Buck smiled. "I'm sure I don't know. I have a machine but I haven't the slightest idea of whether or not it's any good."

"Why not?"

"I can destroy—I hope—but I can't build up their ray. I can't test the machine because I haven't their ray to test it against."

"What can we do to test it?"

"The only thing I can see is to call for volunteers—and send out a six-man cruiser. If the ship's too small, they may not destroy it with the big crumbler rays. If it's too large—and the machine didn't work—we'd lose too much."

Twelve hours later, the IP men at the Lunar Bank fort were lined up. McLaurin stepped up on the platform, and addressed the men briefly, told them what was needed. Six volunteers were selected by a process of elimination, those who were married, had dependents, officers, and others were refused. Finally, six men of the IP were chosen, neither rookies nor veterans, six average men. And one average six-man cruiser, one hun-

dred and eleven feet long, twenty-two in diameter. It was the T-208, a sister ship of the T-247, the first ship to be destroyed.

The T-208 started out from Luna, and with full acceleration, sped out toward Phobos. Slowly she circled the satellite, while distant scouts kept her under view. Lazily, the Miran patrol on Phobos watched the T-208, indifferent to her. The T-208 dove suddenly, after five fruitless circles of the tiny world, and with her four-foot UV beam flaming, stabbed angrily at a flight of Miran scouts berthed in the very shadow of a great battle cruiser, one of the interstellar ships stationed here on Phobos.

Four of the little ships slumped in incandescence. Angry the terrific sword of energy slashed at the frail little scouts.

Angrily the Miran interstellar ship shook herself abruptly into action against this insolent cruiser. The cruiser launched a flight of the mercury-torpedoes. Flashing, burning, ultra-violet energy flooded the great ship, harmlessly, for the men were, as usual protected. The Miran answered with the neutron beam, atomic and gamma bombs—and the crumbler ray.

Gently, softly a halo of shimmering violet luminescence built up about the T-208. The UV beam continued to flare, wavering slightly in its aim—then fell way off to one side. The T-208 staggered suddenly, wandered from her course—whole, but uncontrolled. For the men within the ship were dead.

Majestically the Miran swung along beside the dead ship, a great magnetic tow-cable shot out toward it, to shy off at first, then slowly to be adjusted, and take hold in the magnetic shield of the T-208. The pilots of

the watching scout-ships turned away. They knew what would happen.

It did. Five—ten—twenty seconds passed. Then the "dead-man" took over the ship—and the stored power in the atostor tanks blasted in a terrible flame that shattered the metal hull to molecular fragments. The interstellar cruiser shuddered, and rolled half over at the blasting pressure. Leaking seams appeared in her plates.

The scouts raced back to Luna as the Miran settled heavily, and a trifle clumsily to Phobos. Miran radio-beams were forcing their way out toward the Miran station on Europa, to be relayed to the headquarters on Jupiter, just as Solarian radio beams were thrusting through space toward Luna. Said the Miran messages: "Their ships no longer crumble." Said the Solarian messages: "The ships no longer crumble—but the men die."

HIS deep eyes burning tensely, Buck Kendall heard the messages coming in, and rose slowly from his seat to pace the floor. "I think I know why," he said at last. "I should have thought. For that too can be prevented."

"Why—what in the name of the Planets?" asked McLaurin. "It didn't kill the men in the forts—why does it kill the men in the ships, when the ships are protected?"

"The protection kills them."

"But—but they had the protective oscillations on all the way out!" protested the Commander.

"Think how it works though. Think, man. The Enemy's field is an electric-field oscillation. We combat it by setting up a similar oscillating field in the metal of the hull ourselves. Because the metal conducts the

strains, they meet, and oppose. It is not a shield—a shield is impossible, as I have said, because of energy concentration factors. If their beam carried a hundred thousand horsepower in a ten-foot square beam, in every ten square feet of our shield, we'd have to have one hundred thousand horsepower. In other words, hundreds of times as much energy would be needed in the shield, as they used in their beam. We can't afford that. We have to let the beams oppose our oscillations in the metal, where, because the metal conducts, they meet on an equal basis. But—when two oscillations of slightly different frequency meet, what is the result?"

"In this case, a heterodyne frequency of a lower, and harmless frequency."

"So I thought. I was partly right. It does *not* harm the metal. But it kills the men. It is super-sonic. The terrible, shrill sounds destroy the cells of the men's bodies. Then, when their dead hands release the controls, the automatic switches blow up the ship."

"God! We stop one menace—and it is like the Hydra. For every head we lop off, two spring up."

"Ah—but they are lesser heads. Look, what is the fundamental difference between sound and light?"

"One is a vibration of matter and the—ah—eliminate the material contact!"

"Exactly! All we need to do is to let the ships operate airless, the men in space ships. Then the air cannot carry the sounds to them. And by putting special damping materials in their suits, we can stop the vibrations that would reach them through their feet and hands. Another six-man ship must go out—but this ship will come back!"

And with the order for another experimental ship, went the orders for commercial supplies of this new apparatus. Every IP ship must be equipped to resist it.

Buck Kendall sailed on the six-man scout that went out this time. Again they swooped once at Phobos, again Miran scout-ships crumbled under the attack of the vicious UV beams. The Mirans were not waiting contemptuously this time. In an instant the great interstellar ship rose from its berth, its weapons working angrily. The crumbler ray snapped out at the T-253.

Kendall stared into the periscope visor intently. Clumsily his padded hands worked at the specially adapted controls. The soft hiss of the oxygen release into his suit disturbed him slightly. The radio-phones in his helmet carried all the conversations in the ship to him with equal clarity. He watched as the great ship angled angrily up—

His vision was momentarily obscured by a violet glow that built up and reached out gently from every point of metal in the ship. The instant Kendall saw that, the T-253 was fleeing under his hands. The test had been made. Now all he desired was safety again. The ion-rockets flared recklessly as, crushed under an acceleration of four earth-gravities, he sank heavily into his seat. Grimly the Miran ship was pursuing them, easily keeping up with the fleeing midget. The crumbler became more intense, the violet glow more vivid.

The UV beam was reaching out directly behind now. The—

With a cry of agony, Kendall ripped the radio-phone connection out of his suit. A soft hiss of leaking air warned him of too great violence only minutes later. For his ears had been

deafened by the sudden shriek of a tremendous signal from outside!

Instantly Kendall knew what that meant. And he could not communicate with his men! There was no metal in these special suits, even the oxygen tanks were made of synthetic plastics of tremendous strength. No scrap of vibrating metal was permissible. The padded gloves and boots protected him—but there was a new and different type of crackle and haze from the metal points now. It was almost invisible in the practically airless ship, but Kendall saw it.

Presently he felt it, as he desperately increased his acceleration. Slow creeping heat was attacking him. The heat was increasing rapidly now. Desperately he was working at the crumbler-protection controls — but immediately set them back as they were. He had to have the crumbler protection as well—!

GRIMLY the great Miran ship hung right beside them. Angrily the two four-foot UV beams flashed back—seeking some weak spot. There were none. At her absolute maximum of acceleration the little ship plunged on. Gamma and atomic bombs were washing her in flame. The heavy blocks of paraffine between her walls were long since melted, retained only by the presence of the metal walls. Smoke was beginning to filter out now, and Kendall recognized a new, and deadlier menace! Heat—quantities of heat were being poured into the little ship, and the neutron guns were doing their best to add to it. The paraffine was confined in there—and like any substance, it could be volatilized, and as a vapor, develop pressure—explosive pressure!

The Miran seemed satisfied in his tactics so far—and changed them.

Forty-seven million miles from earth, the Miran simply accelerated a bit more, and crowded the Solarite ship a bit. White faced, Buck Kendall was forced to turn a bit aside. The Miran turned also. Kendall turned a bit more—

Flashing across his range of vision at an incredible speed, a tiny thing, no more than twenty feet long and five in diameter, a scout-ship appeared. Its tiny nose ultra violet beam was blasting a solid cylinder of violet incandescence a foot across in the hull of the Miran—and, to the Miran, angling swiftly across his range of vision. Its magnetic field clashed for a thousandth of a second with the T-253, instantly meeting, and absorbing the fringing edges. Then—it swept through the Miran's magnetic shield as easily. The delicate instruments of the scout instantaneously adjusted its own magnetic field as much as possible. There was resistance, enormous resistance—the ship crumpled in on itself, the tail vanished in dust as a sweeping crumbler beam caught it at last—and the remaining portion of the ship plowed into the nose of the Miran.

The Miran's force-control-room was wrecked. For perhaps a minute and a half, the ship was without control, then the control was re-established—and in vain the telescopes and instruments searched for the T-253. Lightless, her rockets out now, her fields damped down to extinction, the T-253 was lost in the pulsing, gyrating fields of half a dozen scout-ships.

Kendall looked grimly at the crushed spot on the nose of the Miran. His ship was drifting slowly away from the greater ship. Presently, however, the Miran put on speed in the direction of earth, and the T-253 fell far behind. The Miran was not

seriously injured. But that scout pilot, in sacrificing life, had thrown dust in their eyes for just those few moments Kendall had needed to lose a lightless ship in lightless space—lightless—for the Mirans at any rate. The IP ships had been covered with a black paint, and in no time at all, Kendall had gotten his ship into a position where the energy radiations of the sun made him indetectable from the Miran's position, since the radiation of his own ship, even in the heat range, was mingled with the direct radiation of the sun. The sun was in the Miran's "eyes," both actual and instrumental.

An hour later the Miran returned, passed the still-lightness ship at a distance of five million miles, and settled to Phobos for the slight repairs needed.

Twelve hours later, the T-253 settled to Luna, for the many rearrangements she would need.

"I rather knew it was coming," Kendall admitted sadly, "but danged if I didn't forget all about it. And—cost the life of one of the finest men in the system. Johnson's family get a permanent pension just twice his salary, McLaurin. In the meantime—"

"What was it? Pure heat, but how?"

"Pure radio. Nothing but short-wave radio directed at us. They probably had the apparatus, knew how to make it, but that's not a good type of heat ray, because a radio tube is generally less than eighty percent efficient, which is a whale of a loss when you're working in a battle, and a whale of an inconvenience. We were heated only four times as much as the Miran. He had to pump that heat into a heat-reservoir—a water tank probably—to protect himself. Highly in-

efficient and ineffective against a large ship. Also, he had to hold his beam on us nearly ten minutes before it would have become unbearable. He was again, trying to kill the men, and not the ship. The men are the weakest point, obviously."

"Can you overcome that?"

"Obviously, no. The thing works on pure energy. I'd have to match his energy to neutralize it. You know it's an old proposition, that if you could take a beam of pure, monochromatic light and divide it exactly in half, and then recombine it in perfect interference, you'd have annihilation of energy. Cancellation to extinction. The trouble is, you never do get that. You can't get monochromatic light, because light can't be monochromatic. That's due to the Heisenberg Uncertainty—my pet bug-bear. The atom that radiates the light, must be moving. If it isn't, the emission of the light itself gives it a kick that moves it. Now, no matter what the quantum might have been, it loses energy in kicking the atom. That changes the situation instantly, and incidentally the 'color' of the light. Then, since all the radiating atoms won't be moving alike, etc., the mass of light can't be monochromatic. Therefore perfect interference is impossible."

"The way that relates to the problem in hand, is that we can't possibly destroy his energy. We can, as we do in the crumbler stunt, change it. He can't, I suspect, put too much power behind his crumbler, or he'd have crumbling going on at home. We get a slight heating from it, anyway. Into the bargain, his radio was after us, and his neutrons naturally carried energy. Now, no matter what we do, we've got that to handle. When we fight his crumbler, we actually add heat-energy to it, our-

selves, and make the heating effect just twice as bad. If we try to heterodyne his radio—presto—it has twice the heat energy anyway, though we might reduce it to a frequency that penetrated the ship instead of all staying in it. But by the proposition, we have to use as much energy, and in fact, remember the 80% rule. We've got to take it and like it."

"But," objected McLaurin, "we don't like it."

"Then build ships as big as his, and he'll quit trying to roast you. Particularly if the inner walls are synthetic plastics. Did you know I used them in the 'S Doradus' and 'Cephid'?"

"Yes. Were you thinking of that?"

"No—just luck—and the fact that they're light, strong as steel almost, and can be manufactured in forms much more quickly. Only the outer hull is tungsto-beryllium. The advantage in this will be that nearly all the energy will be absorbed outside, and we'll radiate pretty fast, particularly as that tungsto-beryllium has a high radiation-factor in the long heat range."

"What does that mean?"

"Well, ordinary polished silver is a mighty poor radiator. Homely example: Try waiting for your coffee to cool if it's in a polished silver pot. Then try it in a tungsto-beryllium pot. No matter how you polish that tungsto-beryllium, the stuff WILL radiate heat. That's why an IP ship is always so blamed cold. You know the passenger ships use polished aluminum outer walls. The big help is, that the tungsto-beryllium will throw off the energy pretty fast, and in a big ship, with a whale of a lot of matter to heat, the Strangers will simply give up the idea."

"Yes, but only two ships in the system compare with them in size."

"Sorry—but I didn't build the IP fleet, and there are lots of tungsten and beryllium on earth. Enough anyway."

"Will they use that beam on the fort? And can't we use the thing on them?"

"They won't and we won't—though we could. A bank of those new million watt tubes—perhaps a hundred of them—and we'd have a pretty effective heater—but an awful waste of power. I've got something better."

"New?"

"Somewhat. I've found out how to make the mirror field in a plate of metal, instead of a block. Come on to the lab, and I'll show you."

"What's the advantage? Oh—weight saved, and silver metal saved."

"A lot more than that, Mac. Watch."

AT the laboratory, the new apparatus looked immensely lighter and simpler than the old. The atostor, the ionizer, and the twin ion-projectors were as before, great, rigid, metal structures that would maintain the meeting point of the ions with inflexible exactitude under any acceleration strains. But now, instead of the heavy silver block in which a mirror was figured, the mirror consisted of a polished silver plate, parabolic to be sure, but little more than a half-inch in thickness. It was mounted in a framework of complex, stout metal braces.

Kendall started the ion-flame at low intensity, so the UV beam was little more than a spotlight.

"You missed the point, Mac. Now—watch that tungsto-beryllium plate. I'll hold the power steady. It's an

eighteen inch beam—and now the energy is just sufficient to heat that tungsten plate to bright red. But—" Kendall turned over a small rheostat control—and abruptly the eighteen inch diameter spot on the tungstoberyllium plate began contracting, it contracted till it was a blazing, sparkling spot of molten incandescence less than an inch across!

"That's the advantage of focus. At this distance of a few hundred feet with a small beam I can do that. With a twenty-foot beam, I can get a two-foot spot at a distance of nearly ten miles! That means that the receiving end will have the pleasure of handling *one hundred times the energy concentration*. That would punch a hole through most anything. All you have to do is focus it. The trouble being, if it's out of focus the advantage is more than lost. So if there's any question about getting the focus, we'll get along without it."

"A real help, if you do. That would punch a hole before the Stranger ship could turn away as they do now."

Kendall nodded. "That's what I was after. It is mainly for the forts though. We'll have to signal the dope to the Mars Center and Deenmor stations. They can fix it up, themselves. In the meantime—all we can do is hold on and hunt, and let's hope better than the Strangers do."

CHAPTER X

SADLY the convalescent Gresth Gkae listened to the reports of his lieutenants. More and more disgraced he felt as he realized how badly he had blundered in reporting the people of this system unable to cope with the attackers' weapons. Gresth Gkae looked up at his old friend and physician, Merth Skahl.

He shook his head slowly. "I'm afraid, Merth Skahl. I am afraid. We have, perhaps, made a mistake. The better and the stronger alone should rule. Aye, but is the *stronger* always the *better*? I am afraid we have mistaken the Truth in assuming this. If we have—then may Jarth, Lord of Truth and Wisdom punish us. Mighty Jarth, if I have mistaken in following my judgments, it is not from disobedience, it is lack of Thy knowledge. The strongest—they are not always the better, are they?"

Merth Skahl bent sharply over his friend. "Quiet thyself, Gresth Gkae. You know, and I know, you have done only your best, and surely Jarth himself can ask no better of any one. You must rest, for only by rest can those terrible burns be healed. All your *sheen* over half the body-area was burned off. You have been delirious for many days."

"But Merth Skahl, think—have we disobeyed Jarth's will? It is, we know, his will that only the best and the strongest shall rule—but are the best always the strongest? An imbecile adult could destroy the life of a genius-grade child. The strongest wins, but not the best. Such would not be the will of Jarth. If we be the stronger, *and* the best, then it is right and just that these strange creatures should be destroyed that we may have a stable world of stable light and heat. But look and see, with what terrible swiftness these strange creatures have learned! May it not be they are the better race—that it is *we* who are the weaker and the poorer? Can it be that Jarth has brought us together that these people might learn—and destroy us? If they be the stronger, and the better—then may Jarth's will be done. But we must test our strength to the utmost.

I must rise, and go to my laboratory soon. They have set it up?"

"Aye, they have, Gresth Gkae. But remember, the weak and the sick make faults the strong and the well do not. Better that you rest yourself. There is little you can do while your body seeks to recover from these terrible burns."

"You are wrong, my friend, wrong. Don't you see that my mind is clear—that it is the mind which must fight in these battles, for surely the man is weak against such things as this infra-X-radiation? Why, I am better able to fight now than are you, for I am a trained fighter of the mind, while you are a trained healer of the body. These strange beings with their stiff arms and legs, their tender skins, and—and their swift minds have fought us all too well. If we must test, let it be a test. I have heard how they so quickly solved the riddle of the crumbling field. That took us longer, and we designed it. The Counsel of Worlds put me in command—let me up, Merth Skahl, I must work."

Concerned, the physician looked down at him. Finally he spoke again. "No, I will not permit you to leave the hospital-ship. You must stay here, but if, as you have said, the mind is what must fight, then surely you can fight well from here, for your mind is here."

"No, I cannot, and you well know it. I may shorten my life, but what matter. 'Death is the end toward which the chemical reaction, Life, tends.'" quoted the scientist. "You know I have left my children—my immortality is assured through them. I can afford to die in peace, if it assures their welfare. Time is precious, and while my mind might work from here, it must have data on which to work. For that, I must go

to the laboratories. Help me, Merth Skahl."

Reluctantly the physician granted the request, but begged of Gresth Gkae a promise of at least six hours rest in every fifteen, and a good sleep of at least twenty-seven hours every "night." Gresth Gkae agreed, and from a wheel-chair, conducted his work, began a new line of experimentation he hoped would yield them the weapon they needed. Under him, the staff of scientists worked, aiding and advising and suggesting. The apparatus was built, tested, and found wanting. Time and again as the days passed, they watched Gresth Gkae, gaining strength very, very slowly, taken away despondent at the end of his forty hours of work.

A dozen expeditions were sent to Jupiter's poles to watch and measure and study the tremendous auroral displays there, where Jupiter's vast magnetic field sucked in countless quintillions of the flying electrons from the sun, and brought them circling in, in a vast, magnificent display of auroral ionization.

EXPEDITIONS went to the great Southern Plateau, the Plateau of Storms, where the titanic air currents resulted in an everlasting display of terrific lightnings, great burning balls of electric force floating dangerous and deadly across the frozen, ultra-cold plain.

And the expeditions brought back data. Yet still Gresth Gkae could not sleep soundly, his thoughts intruding constantly. Hours Merth Skahl spent with him, calming him to sleep.

"But what is this constant search? It is little enough I know of science, but why do you send our men to these spots of wonderfully beautiful, but useless natural forces. Can we some-

how, do you think, turn them against the people of these worlds?"

Softly the old Miran smiled. "Yes, you might say so. For look, it is the strange balls of electric force I want to know about. Sthor had few, but occasionally we saw them. Never were they properly investigated. I want to know their secret, for I am sure they are balls of electric forces not vastly dissimilar from the nucleus of the atom. Always we have known that no system of purely electrical forces could remain stable. Yet these strange balls of energy do. How is it? I am sure it will be of vast importance. But the direct secret I hope to learn is in this: What can be done with electric fields can nearly always be duplicated, or paralleled in magnetic fields. If I can learn how to make these electric balls of energy, can I not hope to make similar magnetic balls of energy?"

"Yes, I see—that would seem true. But what benefit would you derive from that? You have magnetic beams now, and yet they are useless because you can get nowhere near the forts, and destroy them. How then would these benefit you?"

"We can do nothing to those forts, because of that magnetic shield. Could we once break it down, then the fort is helpless, and one or two small atomic bombs destroy it. But—we cannot stay near, for the terrible infra-X-rays of theirs burn holes in our ships, and—in our men."

"But look you, I can drop many atomic bombs from a distance where their beams are ineffective. Suppose I do make a magnetic ball of energy, a magnetic bomb. Then—I can drop it from a distance! We have learned that the power supply of these forts is very great—but not endless, as is ours now, thanks the vast supplies

of power metal on this heavy planet. Then all we need do is stay at a distance where they cannot reach us—and drop magnetic bombs. Ah, they will be stopped, and their energy absorbed. But we can keep it up, day after day, and slowly drain out their power. Then—then our atomic bombs can destroy those forts, and we can move on!" But suddenly the animation and strength left his voice. He turned a sad, downcast face to his friend. "But Merth Skahl, we can't do it," he complained.

"Ah—now I can see why you so want to continue this wearing and worrying work. You need time, Gresth Gkae, only time for success. Tomorrow it may be that you will see the first hint that will lead you to success."

"Ah—I only hope it, Merth Skahl, I only hope it."

But it was the next day that they saw the first glimpse of the secret, and saw the path that might lead to hope and success. In a week they were sending electric bombs across the laboratory. And in three days more, a magnetic bomb streaked dully across the laboratory to a magnetic shield they had set up, and buried itself in it, to explode in brilliant light and heat.

FROM that day Gresth Gkae began to mend. In the three weeks that were needed to build the apparatus into ships, he regained strength so that when the first flight of five great interstellar ships rose from Jupiter, he was on the flagship.

To Phobos they went first, to the little inner satellite of Mars, scarcely eight miles in diameter, a tiny bit of broken metal and rock, utterly airless, but scarcely more than 3700 miles from the surface of Mars below. The

Mars Center and Deenmor forts were wasting no power raying a ship at that distance. They could, of course, have damaged it, but not severely enough to make up for the loss of their strictly limited power. The photo-cells had been working overtime, every minute of available light had been used, and still scarcely 2100 tons of charged mercury remained in the tanks of Mars Center and 1950 in the tanks at Deenmor.

The flight of five ships settled comfortably upon Phobos, while the three relieved of duty started back to Jupiter. Immediately work was begun on the attack. The ships were first landed on the near side, while the apparatus of the projectors was unloaded, then the great ships moved around to the far side. Phobos of course rotated with one face fixed irrevocably toward Mars itself, the other always to the cold of space. Great power leads trailed beneath the ships, and to the dark side. Then there were huge water lines for cooling. On this almost weightless world, where the great ships weighing hundreds of thousands of tons on a planet, weighed so little they were frequently moved about by a single man, the laying of five miles of water conduit was no impossibility.

Then they were ready. Mars Center came first. Automatic devices kept the aim exact, as the first of the magnetic bombs started down. At five second intervals they were projected outward, invisible globes of concentrated magnetic energy, indetectable in space. Seven seconds passed before the first became dimly visible in the thin air of Mars. It floated down, it would miss the fort it seemed—so far to one side. Abruptly it turned, and darted with tremendously accelerating speed for the great mag-

netic field of the fort. With a vast blast of light, it exploded. Five seconds later a second exploded. And a third.

Mars Center signaled scoffingly that the bombs were all being stopped dead in the magnetic atmosphere, after the bombardment had been witnessed from earth and Luna. An hour later they gave a report that they were concentrated magnetic fields of energy that would be rather dangerous—if it weren't that they couldn't even stand into the magnetic atmosphere. Three hours later Mars Center reported that they contained considerably more energy than had at first been thought. Further, which they had not carefully considered at first, they were taking energy with them! They were taking away about an equal amount of energy as each blew up.

It was only a half hour after that that the men at Mars Center realized perfectly what it meant. Their power was being drained just a little bit better than twice as fast as they generated during the day—and since Phobos spun so swiftly across the sky.

Deenmor got the attack just about the time Mars Center was released. Deenmor immediately began seeking for the source of it. Somewhere on Phobos—but where?

The Mirans were experts at camouflage. Deenmor Station, realizing the menace, immediately rayed the "projector." They tore up a great deal of harmless rock with their huge UV rays. But the bomb device continued to throw one bomb each five seconds.

When Deenmor operated from Phobos' position, Mars Center was exposed to the deadly, constant drain. A day or two later, the bombs were

coming one each second and a half, for more ships had joined in the work on Phobos.

Gresth Gkae saw the work was going nicely. He knew that now it was only a question of time before those magnetic shields would fail—and then the whole fort would be powerless. Maybe—it might be a good idea, when the forts were powerless to investigate instead of blowing them up. There might be many interesting and worthwhile pieces of apparatus—particularly the UV beams apparatus.

CHAPTER XI

BUCK KENDALL entered the Communications room rather furtively. He hated the place. Cole was there, and McLaurin. Mac was looking tired and drawn, Cole not so tired, but equally drawn. The signals were coming through fairly well, because most of the disturbance was rising where the signals rose, and all the disturbance, practically, was magnetic rather than electric.

"Deware is sending, Buck," McLaurin said as he entered. "They're down to the last fifty-five tons. They'll have more time now—a rest while Phobos sinks. Mars Center has another 250 tons, but—it's just a question of time. Have you any hope to offer?"

"No," said Kendall in a strained voice. "But, Mac, I don't think men like those are afraid to die. It's dying uselessly they fear. Tell 'em—tell 'em they've defended not alone Mars, but all the system, in holding up the Strangers on Mars. We here on Luna have been safer because of them. And tell—Mac, tell them that in the meantime, while they defended us, and gave us time to work, we have begun

to see the trail that will lead to victory."

"*You have!*" gasped McLaurin.

"No—but they will never know!" Kendall left hastily. He went and stood moodily looking at the calculator machines—the calculator machines that refused to give the answers he sought. No matter how he might modify that original idea of his, no matter what different line of attack he might try in solving the problems of Space and Matter, while he used the system he *knew* was right—the answer came down to that deadly, hope-blasting expression that meant only "uncertain."

Even Buck was beginning to feel uncertain under that constant crushing of hope. Uncertainty—uncertainty was eating into him, and destroying—

From the Communications room came the hum and drive of the great sender flashing its message across seventy-two millions of miles of nothing. "B-u-c-k K-e-n-d-a-l-l s-a-y-s h-e h-a-s l-e-a-r-n-e-d s-o-m-e-t-h-i-n-g t-h-a-t w-i-l-l l-e-a-d t-o v-i-c-t-o-r-y w-h-i-l-e y-o-u h-e-l-d b-a-c-k t-h-e—"

Kendall switched on a noisy, humming fan viciously. The too-intelligible signals were drowned in its sound.

"And—tell them to—destroy the apparatus before the last of the power is gone," McLaurin ordered softly.

The men in Deenmor station did slightly better than that. Gradually they cut down their magnetic shield, and some of the magnetic bombs tore and twisted viciously at the heavy metal walls. The thin atmosphere of Mars leaked in. Grimly the men waited. Atomic bombs—or ships to investigate? It did not matter much to them personally—

Gresth Gkae smiled with his old vigor as he ordered one of the great interstellar ships to land beside the powerless station, approaching from such an angle that the still-active Mars-center station could not attack. One of the fleet of Phobos rose, and circled about the planet, and settled gracefully beside the station. For half an hour it lay there quietly, waiting and watching. Then a crew of two dozen Mirans started across the dry, crumbly powder of Mars' sands, toward the fort. Simultaneously almost, three things happened. A three-foot UV beam wiped out the advancing party. A pair of fifteen foot beams cut a great gaping hole in the wall of the interstellar ship, as it darted up, like a startled quail, its weapons roaring defiance, only to fall back, severely wounded.

And the radio messages pounded out to earth the first description of the Miran people. Methodically the men in Deenmor station used all but one ton of their power to completely and forever wreck and destroy the interstellar cripple that floundered for a few moments on the sands a bare mile away. Presently, before Deenmor was through with it, the atomic bombs stopped coming, and the atomic shells. The magnetic shield that had been reestablished for the few minutes of this last, dying sting, fell.

Deenmor station vanished in a sudden, colossal tongue of blue-green light as the ton of atomically distorted mercury was exploded by a projector beam turned on the tank.

IT was long gone, when the first atomic bombs and magnetic bombs dropped from Phobos reached the spot, and only hot rock and broken metal remained.

Mars Center failed in fact the next time Phobos rode high over it. The apparatus here had been carefully destroyed by technicians with a view of making it indecipherable, but the Mirans made it even more certain, for no ship settled here to investigate, but a stream of atomic bombs that lasted for over an hour, and churned the rock to dust, and the dust to molten lava, in which pools of fused tungsto-beryllium alloy bubbled slowly and sank.

"Ah, Jarth—they are a brave race, whatever we may say of their queer shape," sighed Gresth Gkae as the last of Mars Center sank in bubbling lava. "They stung as they died." For some minutes he was silent.

"We must move on," he said at length. "I have been thinking, and it seems best that a few ships land here, and establish a fort, while some twenty move on to the satellite of the third planet and destroy the fort there. We cannot operate against the planet while that hangs above us."

Seven ships settled to Mars, while the fleet came up from Jupiter to join with Gresth Kkae's flight of ships on its way to Luna.

An automatically controlled ship was sent ahead, and began the bombardment. It approached slowly, and was not destroyed by the UV beams till it had come to within 40,000 miles of the fort. At 60,000 Gresth Gkae stationed his fleet—and returned to 150,000 immediately as the titanic UV beams of the Lunar Fort stretched out to their maximum range. The focus made a difference. One ship started limping back to Jupiter, in tow of a second, while the rest began the slow, methodical work of wearing down the defenses of the Lunar Fort.

Kendall looked out at the mag-

nificent display of clashing, warring energies, the great, whirling spheres and discs of opalescent flame, and turned away sadly. "The men at Deenmor must have watched that for days. And at Mars Center."

"How long can we hold out?" asked McLaurin.

"Three weeks or so, at the present rate. That's a long time, really. And we can escape if we want to. The UV beams here have a greater range than any weapon the Strangers have, and with earth so near—oh we could escape. Little good."

"What are you going to do?"

"I," said Buck Kendall, suddenly savage, "am going to consign all the math. machines in the universe to eternal damnation—and go ahead and build a machine anyway. I know that thing ought to be right. The math.'s wrong."

"There is no other thing to try?"

"A billion others. I don't know how many others. We ought to get atomic energy somehow. But that thing infuriates me. A hundred things that math. has predicted, that I have checked by experiment, simple little things. But—when I carry it through to the point where I can get something useful—it wriggles off into—uncertainty."

Kendall stalked off to the laboratory. Devin was there working over the calculus machines, and Kendall called him angrily. Then more apologetic, he explained it was anger at himself. "Devin, I'm going to make that thing, if it blows up and kills me. I'm going to make that thing if this whole fort blows up and kills me. That math. has blown up in my face for four solid months, and half killed me, so I'm going to kill it. Come on, we'll make that damned junk."

Angrily, furiously, Kendall drove

his helpers to the task. He had worked out the apparatus in plan a dozen times, and now he had the plans turned into patterns, the patterns into metal.

SAUCILY, the "S Doradus" made the trip to and from earth with patterns, and with metal, with supplies and with apparatus. But she had to dodge and fight every inch of the way as the Miran ships swooped down angrily at her. A swift, fighting craft could get through when the Miran fleet was withdrawn to some distance, but the Mirans were careful that no heavy-loaded freighter bearing power supply should get through.

And Gresth Gkae waited off Luna in his great ship, and watched the steady streams of magnetic bombs exploding on the magnetic shield of the Lunar Fort. Presently more ships came up, and added their power to the attack, for here, the photo-cell banks could gather tremendous energy, and Gresth Gkae knew he would need to overcome this, and drain the accumulated power.

Gresth Gkae felt certain if he could once crack this nut, break down earth, he would have the system. This was the home planet. If this fell, then the two others would follow easily, despite the fact that the few forts on the innermost planet, Mercury, could gather energy from the sun at a rate greater than their ships could generate.

It took Kendall two weeks and three days to set up his preliminary apparatus. They had power for perhaps four days more, thanks to the fact that the long Lunar day had begun shortly after Gresth Gkae's impatient attack had started. Also, the "S Doradus" had brought in several hundred tons of charged mercury on

each trip, though this was no great quantity individually, it had mounted up in the ten trips she had made. The "Cepheid," her sister ship, had gone along on seven of the trips, and added to the total.

But at length the apparatus was set up. It was peculiar looking, and it employed a great deal of power, nearly as much as a UV beam in fact. McLaurin looked at it sceptically toward the last, and asked Buck: "What do you expect it to do?"

"I am," said Kendall sourly, "uncertain. The result will be uncertainty itself."

Which, considering things, was a surprisingly accurate statement. Kendall gave the exact answer. He meant to give an ironic comment. For the mathematics had been perfectly correct, only Buck Kendall misinterpreted the answer.

"I've followed the math. with mechanism all the way through," he explained, "and I'm putting power into it. That's all I know. Somewhere, by the laws of cause and effect, this power *must* show itself again—despite what the damn math. says."

And in that of course, Kendall was wrong. Because the laws of cause and effect didn't hold in what he was doing now.

"Do you want to watch?" he asked at length. "I'm all set to try it."

"I suppose I may as well," smiled McLaurin. "In our close-knit little community the fate of one is of interest to all. If it's going to blow up, I might as well be here, and if it isn't I want to be."

Kendall smiled appreciatively and replied: "Let it be on thy own head. Here she goes."

He walked over to the power board, and took command. Devin, and a squad of other scientists were seated

about the room with every conceivable type and combination of apparatus. Kendall wanted to see what this was doing. "Tubes," he called. "Circuits A and D. Tie-ins," he stopped, the preliminary switches in. "Main circuit coming." With a jerk he threw over the last contact. A heavy relay thudded solidly. The hum of a straining atostor. Then—

An electric motor, humming smoothly stopped with a jerk. "This," it remarked in a deep throaty voice, "is probably the last stand of humanity."

The galvanometer before which Devin was seated apparently agreed. In a rather high pitched voice it pointed out that: "If the Lunar Fort falls, the earth—" it stopped abruptly, and an electroscope beside Douglass took up the thread in a high, shrill voice, rather slurred. "—will be directly attacked."

"This," resumed the motor in a hoarse voice, "will certainly mean the end of humanity." The motor gave up the discourse and hummed violently into action—in reverse!

"My God!" Kendall pulled the switch open with a sagging jaw and staring eyes.

THE men in the room burst into sudden startled exclamations.

Kendall didn't give them time. His jaw snapped shut, and a blazing light of wonderous joy shone in his eyes. He instantly threw the switch in again. Again the humming atostor, the strain—

Slowly Devin lifted from his seat. With thrashing arms and startled, staring eyes, he drifted gently across the room. Abruptly he fell to the floor, unhurt by the light Lunar gravity.

"I advise," said the motor in its

grumbling voice, "an immediate exodus." It stopped speaking, and practiced what it preached. It was a fifty-horse moto-generator, on a five-ton tungsto-beryllium, base, but it rose abruptly, spun rapidly about an axis at right angles to the axis of its armature, and stopped as suddenly. In mid air it continued its interrupted lecture. "Mercury therefore is the destination I would advise. There power is sufficient for—all machines." Gently it inverted itself and settled to the middle of the floor. Kendall instantly cut the switch. The relay did not chunk open. It refused to obey. Settled in the middle of the floor now, torn loose from its power leads, the moto-generator began turning. It turned faster and faster. It was shrilling in a thin scream of terrific speed, a speed that should have torn its windings to fragments under the lash of centrifugal force. Contentedly it said throatily. "Settled."

The galvanometer spoke again in its peculiar harsh voice. "Therefore, move." Abruptly, without apparent reason, the stubborn relay clicked open. The shrilly screaming motor stopped dead instantly, as though it had had no real momentum, or had been inertialess.

Startled, white-faced men looked at Kendall. Buck's eyes were shining with an unholy glee.

"*Uncertainty!*" he shouted. "Uncertainty—uncertainty—uncertainty, you fools! Don't you see it? All the math—it said uncertainty—man, man—we've got just that—uncertainty!"

"You're crazy," gasped McLaurin. "I'm crazy, everything's gone crazy."

Kendall roared with sudden, joyous laughter. "Absolutely. Everything goes crazy—the laws of nature break

down! Heisenberg's principle showed that the law of cause and effect weren't absolute. We've made them absolutely uncertain!"

"But—but motors *talking*, instruments giving lectures—"

"Certainly—or rather uncertainly—anything, absolutely anything. The destruction of the laws of gravity, freedom from inertia—why merely picking up a radio lecture is nothing!"

Suddenly, abruptly, a thousand questions poured in on him. Jubilantly he answered what he could, told what he thought—and then brought order. "The battle's still on, men—we've still got to find out how to use this, now we've got it. I have an idea—that there's a lot more. I know what I'll get this time. Now help me remake this apparatus so we don't broadcast the thing."

At once, ten times the former pace, work was done. On the radio, news was sent out that Kendall was on the right track after all. In two hours the apparatus had been vastly altered, it was in the final stage, and an entirely different sort of field set up. Again they watched as Buck applied the power.

The atostor hummed—but no strange tricks of matter happened this time. The more concentrated, altered field was, as Buck was to find out later, "*Uncertainty of the Second Degree.*" It was molecular uncertainty. In a field a foot and a half in diameter, Buck saw the thing created—and suddenly a brilliant green-blue flame shot up, and a great dark cloud of terrible, red-brown deadly vapor. Then an instant later, Kendall had opened the relay. Gasping, the men ran from the laboratory, shutting the deadly fumes in. "*N.O.*"

gasped Morton, the chemist, as they reached safety. "It's exothermic—but it formed there!"

IN that instant, Kendall grasped the meaning of the choking fumes carried. "Molecular uncertainty!" he decided. "We're going back—we're getting there—"

He altered the apparatus again, added another atostor in series, reduced the size of his sphere of forces—of strange chaos of uncertainty. Within—little was certain. Without—the laws of nature applied as ever.

Again the apparatus was started, cautiously this time. Only a strange jumbled ionization appeared this time, then a slow, rising blue flame began to creep up, and burn hot and blue. Buck looked at it for a moment, then his face grew tense and thoughtful. "Devin—give me a half-dollar." Blankly, Devin reached in his pocket, and handed over the metal disc. Cautiously Buck Kendall tossed it toward the sphere of force. Instantly there was a flash of flame, soundless and soft-colored. Then the silver disc was outlined in light, and swiftly, inevitably crumbling into dust so fine only a blue haze appeared. In less than two seconds, the metal was gone. Only the dense blue fog remained. Then this began to go, and the leaping blue flame grew taller, and stronger.

"We're on the track—I'm going to stop here, and calculate. Bring the data—"

Kendall shut off the machine, and went to the calculation room. Swiftly he selected already prepared graphs, graphs of the math. he had worked on. Devin came soon, and others. They assembled the data and with tables and arithmetical machines turned it into graphs.

Then all these graphs were fed into the machine. There were curves, and sine-curves, abrupt breaking lines—but the answer that came but when all were compounded was a perfect diagram of a flight of four steps, descending in unequal treads to zero.

Kendall looked at it for long minutes. "That," he said at length, "is what I expected. There are four degrees of uncertainty, we generated 'Uncertainty of the First Degree,' 'Mass Uncertainty' when we started. That, as here shown, takes little energy concentration. Then we increased the energy concentration and got 'Uncertainty of the Second Degree,' 'Molecular Uncertainty.' Then I added more power, and reduced the field, and got 'Uncertainty of the Third Degree'—'Atomic Uncertainty.' There is 'Uncertainty of the Fourth Degree' It is barely attainable with our atostors. It is—utter uncertainty."

"In the First Degree, the laws of mass action fail, the great broad-reaching laws. In the Second Degree, the laws of the molecules, a finer organization, break down, and anything can happen in chemistry. In the Third Degree, the laws of atomic physics break down slowly. The atom is tough. It is very compact, and we just barely attained the concentration needed with that apparatus. But—in the Third Degree, when the Atomic Laws break down into utter uncertainty, the atoms break, and only hydrogen can exist. That was the blue flame."

"But the Fourth Degree—*there is no law whatsoever*, nothing in all the Universe can exist. It means—the *utter destruction and release of the energy of matter!*" Kendall paused for a moment. "We have won, with this. We need only make up this apparatus—and maybe make it into a

weapon. You know, in the Fourth Degree, nothing in all the Universe could resist, deflect, or control it, if launched freely, and self-maintaining. I think that might be done. You see, no law affects it, for it breaks down the law. Magnetism cannot attract or repel it because magnetic fields cannot exist; there is no law of magnetic force, where this field is.

"And you know, Devin, how I have analyzed and duplicated their magnetic ball-fields. This should be capable of formation into a ball-field.

"We need only make it up now. We will install it in the 'S Doradus' and the 'Cepheid' as a weapon. We need only install it as an energy source here. Let us start."

CHAPTER XII

BUCK KENDALL with a slow smile, looked out of the port in the thick metal wall. The magnetic shield of the Lunar Fort was washed constantly with the fires of exploding magnetic bombs. The smile spread broader. "My friends," he said softly, "you can pull from now till doomsday as far as I'm concerned, and you won't even disturb us now." He looked back over his shoulder into the power room. A hunched bulk, beautifully designed and carefully finished, the apparatus that created 'Uncertainty' of the Fourth Degree' was destroying matter, and creating by its destruction terrific electric fields. These fields were feeding the magnetic shield now. Under the present drain, the machine was not noticeably working. In fact, Kendall was a bit annoyed. He had tested out the energy generating properties of this machine, trying to find a limit. He had found there was no limit. The great copper conduc-

tors, charged with the same atostor force that was used in the mercury fuel, were perfect conductors, they had not heated. But the eleven thousand tons of discharged mercury metal had been completely charged in just a bit better than eleven minutes. The pumps wouldn't force it through the charging apparatus any faster than that.

Two weeks more had passed, while the "S Doradus" and the "Cepheid" were fitted out with the new apparatus Buck had designed. They were almost ready to start now.

McLaurin came down the corridor, and stopped near Kendall. He too smiled at the Miran's attempts. "They've got a long way to go, Buck."

"They're going a long way. Clear back home—and we'll be right along. I don't think they can outdistance us."

"I still don't see why you couldn't use one of those Uncertainty conditions—the First Degree perhaps, and annihilate our inertia."

"You can't control Uncertainty. By its essential character it's beyond control."

"What's that Fourth Degree machine of yours—the material energy—if it isn't controlled and utilized Uncertainty?"

"It's utter and utterly uncontrolled Uncertainty. The matter within that field breaks down to absolutely nothing. Within, no law whatsoever applies, but fortunately, outside the old laws of physics apply—and we can gather and use the energy which is released outside, though nothing can be done inside. Why, think man, if I could control that Uncertainty, I could do anything at all, absolutely anything. It would be a world as unreasonable as a bad dream. Think how

unreasonable those manifestations we first got were!"

"But can't you get any control at all?"

"Very little. Anyway, if I could get inertialess conditions at will, I'd be afraid of them. They'd make chemical reactions impossible in all probability—and life is chemical. Two atoms must come into more or less violent contact before a union takes place, and cannot if they have neither momentum nor inertia."

"Anyway—why worry. I can't do it, because I can't control this thing. And we have the extra-space drive."

"How does that darned thing work? Can't you drop the math, and tell me about it?"

Kendall smiled. "Not too readily. Remember first, as to the driving system, that it works on the fabric of space. Space is, in the physical sense, a fabric woven of the threads of lines of force from every body in the universe, made up of fields and forces. It is elastic, and can transmit strains. But anything that can transmit strains, can be strained against. With the tremendous field intensities available by the material engines, I can get such fields as will 'dig their toes' into space and push.

"That's the drive itself. It is accelerationless, because it enfolds us, and acts equally on every atom of us. By maintaining in addition a slight artificial gravity—thanks also to the intensity of those material engine fields—we can be comfortable, while we accelerate at tremendous rates."

"That is, I think, at least allied to the Stranger's system. For the high speed drive, I do in fact use the Uncertainty. I can control it in a certain sense by determining its powers, and the limits of uncertainty, whether First, Second, Third or Fourth De-

gree. It advances in jumps—but on a finer plotting of the curve, you can see that each jump represents a vast series of smaller jumps. That is there is Class A, B, C, D, and so forth Uncertainty of the First Degree. Now Class A First Degree Uncertainty involves only the deepest, broadest principles. Only they break down. One of these is the law of the speed of light.

"I'm sure that isn't the system the Strangers use, but I'm also sure there's no limit to the speed we can get."

"Doesn't that wreck your drive system?"

"No, because gravity and the fields I use in driving are First Degree Uncertainties of the higher classes.

"But at any rate, it will work. And—I suspect you came to say you were ready to go."

"I did," nodded McLaurin.

"Still stick to your original plan?"

McLaurin nodded. "I think it's best. You follow those fellows back to their system in the 'S Doradus' and I'll stay here in the 'Cepheid' to protect the system. They may need some time to get out of the place here. And remember, we ought to be as decent as they were. They didn't bother the transports leaving Jupiter when they came in, only attacked the warships. We're bound to do the same, but we'll have to keep a watch on them none the less. So you go on ahead."

They started down the corridor, and came presently to the huge locks where the "S Doradus" and the "Cepheid" were berthed. The super-ships lay cold and grey now, men swarming in and out with last-minute supplies. Air, water, spare parts, bedding and personal equipment. Douglass, Cole, and most of the laboratory staff would go with Kendall when he

followed the Strangers home. Devin and a few of the most advanced physicists would stay with McLaurin in case of need.

AN hour later the "S Doradus" rose gently, soundlessly from her berth, and floated out of the opened lock-door. The "Cepheid" followed her in five seconds. Still under the great screen of the fort, the lashing, coruscating colors of the magnetic bombs and the magnetic screen flashed and was iridescent. The "S Doradus" poked her great nose gently through the screen, and an instant later her titanically powerful, material-engine effortlessly discharged a great magnetic bomb, sent with the combined power of five atomic powered interstellar ships. The two ships separated now, the "Cepheid" under McLaurin flashing ahead with sudden, terrific acceleration toward Mars, whispering through space at a speed that made it indetectable, faster than light. The "S Doradus" journeyed out leisurely toward the fleet of forty-seven Miran ships.

Gresth Gkæ saw the "S Doradus" and as he watched the steady progress, felt sudden fear at his heart. The ship seemed so certain—

At a distance of thirty thousand miles, Kendall stopped. Magnetic bombs were washing his screen continuously now, seeking to exhaust the ship as all the great ships beyond poured their energy against it. A slow smile spread over Kendall's mouth as he heard the gentle hum of the barely working material engine. Carefully he aligned the nose UV beam of the "S Doradus" on the nearest of the Miran ships. Then he depressed a switch.

There was no ion-release before the

force-mirror now. Just a jet of gas whirling into a half-inch field of 'Uncertainty of the Fourth Degree.' The matter vanished instantly in released energy so stupendous that the greatest previous UV beams had been harmless things by comparison. Material energy maintained the mirror forces. Material energy gave the power that was released. And only material energy could have stood up before it. Thirty thousand miles away, a Miran ship flamed instantaneously into inconceivable incandescence, vanishing almost in blue-violet light of terrific intensity. The ship reeled away, a half-molten wreck.

The beam spotted two more ships before it winked out. Then Kendall began sending bombs. He moved up to within 2000 miles that his aim might be accurate. They were bombs of 'Uncertainty of the Third Degree,' the Uncertainty of atomic law in bomb form. One hit the nose of the nearest ship, and a sphere five feet in diameter glowed mistily blue for a moment. Then very easily, the matter that formed the wall of the cruiser began to run and change, and presently there was only a hole, and an expanding cloud of gas. Three more flowed toward it—and the hole enlarged, and another hole appeared in a bulkhead behind.

Kendall made a change. For the first time there came the staccato bark of the material engine under strain, as it fashioned the terrific fields of 'Uncertainty of the Ultimate Degree.' Abruptly they leapt out, invisible till they entered a magnetic screen, then run over with opalescent light as the energy of the field was sucked into them and released.

It struck the nose of a ship—a field no larger than an apple—

A titanic gout of energy burst out that was soundless in space. The ship suddenly opened back, opened like the peel of a banana, till a little nub remained at the further end, and the metal flaps dropped back across and behind it dejectedly. A second ship was struck, and it was struck on one side, so that it was shattered like a spent firecracker.

Then the Miran fleet vanished in speed.

Kendall followed them. "I think," he said with a grin, "they tried to use their radio beam, but it spread too much to do anything at that distance. And they used their rotating magnetic field, which we couldn't feel. And their crumbler ray too, of course. I wonder—are they headed only for Jupiter? No—no, they've passed him!"

Faster than light, faster than energy could follow through space, or Uncertainty Bombs pursue, the Mirans were fleeing for home. They knew now that only in speed lay safety. Already they knew that a similar ship had appeared off Jupiter, and, after wiping out the Phobos and Mars stations with one bomb each, had cleared the Jovian Satellites with equal terrible efficiency.

In one of the fleeing ships was a broken, tired old man, and his staff. Gresth Gkae looked back at the blank, distorted space behind them, at the swiftly dwindling sun, and spoke. "I was at fault, my friends. Jarth has spoken. *They* are the stronger and the wiser race. Farth Skalt has shown you—they use space fields of intensity 100. That means the energy of the ultimate destruction. Jarth used us as his instrument of testing, only to drive and stimulate that race. I do not—nay. There is no doubt now, for look."

Plainly visible, rapidly overtaking them, the "S Doradus" appeared sharp, and luminous on the jet of distorted space.

"We cannot escape, my friends. Shall we return to Sthor or remain in space, lost?"

"Let us deflect our course—at least he may not know our destination." The interstellar ship turned very slightly in her course. Plainly, they saw the "S Doradus" flash on, in a straight line, headed for distant, red-glowing Mira. Gresth Gkae watched, and shrugged. Silently he put the ship back on its course, at its utmost speed. Parallel with them, near to them, the "S Doradus" flashed on. Day after day, the two hurled through space faster than light. Gradually Mira brightened, and at last became a disc.

GRESTH GKAE slowed his ships, and Kendall, watching, slowed to match his speed. Five billion miles from Sthor, they had reached normal space speeds. Viciously the Miran fleet attacked the lone ship from earth. Their rays, their bombs, their every weapon was flaming. Great interstellar ships flashed suddenly into speeds greater than that of light, seeking to ram and destroy the smaller ship. The "S Doradus" flashed into equal or greater speed, and eluded them.

Kendall had determined now, which was the leader's ship.

Gresth Gkae watched dully as his ships attempted to destroy the single, small ship. He sighed in resignation, and turned to walk back to the chapel aboard the ship. One last prayer to Jarth—

Gresth Gkae stopped abruptly. The great ship was lurching strangely. Men shouted sudden, frightened cries.

Am. 3.

The clanking and thud of relays sounded, the shrill of alarms. Then the alarms stopped, and suddenly the whole great ship vibrated to an infinitely deep voice speaking in perfect Sthorian. The voice remarked solemnly, in great, vibrant tones, that they would certainly receive news presently from the Expeditions. It went on for some seconds to discuss the conditions as reported in the new system. Then it stopped abruptly. An electric motor just above Gresth Gkae's head suddenly hummed into action without reason or power connection. Almost simultaneously he heard the shouts of startled men as the great lock doors began to open into space of their own accord, bulk-head doors slipped shut as the roar of escaping air echoed in the ship.

Then it was all over. Gresth Gkae ran to the control room. The Mirans there looked up at him with drawn faces.

"The instruments—Gresth Gkae—the instruments. The instruments read impossible things, the motors worked without reason, the fields fluctuated—the atomic engines stopped and the magnetic shield broke down and gripped part of the ship instead!" reported the bewildered pilot.

"I do not know—some strange weapon of—" began the old scientist. Something luminous and huge twisted suddenly through space toward them, a bomb of "Uncertainty of the First Degree." It wrapped the ship silently—and again strange things happened. Abruptly the ship started whirling violently, yet without centrifugal force. The heavens wheeled crazily, and turned about three axes simultaneously. There was no gyroscopic effect to hold them!

Gradually the thing died out. Then a great field seemed to catch the ship,

and hurl it away from its companions. Abruptly the pilot applied all his power to pull free. In vain.

Gresth Gkae shook his head slowly, and raised the pilot's hands from the board. "Let them do as they will. I think they mean us no real harm, Thart Kralt. They can, we know, destroy us in an instant. Perhaps he wants us to go somewhere with him—" Gresth Gkae smiled sadly, "and anyway, we can do nothing."

For nearly a billion miles the great ship was hurled through space at tremendous normal-space velocity. Then abruptly it was halted, without a sign of strain or hurt. The great twenty-foot UV beam on the nose of the "S Doradus" broke into glowing gentle red light. It flashed twice. There was a pause. Then it flashed four times. A long wait. Then three times, a pause and nine times. A wait. Four times, a pause, sixteen times. Then it stopped.

A slow smile of ineffable joy spread over Gresth Gkae's face. "Jarth Be Praised. He can destroy, but does not wish to. Ah, Thart Kralt, turn your spotlight toward him, and flash it five times, then pause, and flash it twenty-five times, for he is trying to start communications with us. Jarth is wise beyond all understanding. They were the weaker race, and they are the stronger. But also they are the better, for they could destroy, and they do not, but seek only to communicate."

EPILOGUE

THE interstellar liner "Mirasol" settled gently to Sthor, having circled wide of Asthor, and from her hold a cargo of the heavy Jovian elements was discharged, while a mixed stream of Solarians

and Mirans came from her passenger quarters.

A delegation of Mirans met the new Ambassador from Sol, Commander McLaurin, and conducted him joyfully to the Central Government Group. Beside the great buildings, a battered, scarred interstellar ship lay, her rear section a mass of great patches, rudely applied, and rudely made, mere cast metal plates.

Gresth Gkae welcomed Commander McLaurin to the Government Hall. "Your arrival today, Commander McLaurin, was most fortunate," he said in the interstellar language that had been developed, "for but yesterday Gresth Talak, my brother, arrived in his ship. Before we made that fortunate-unfortunate expedition against your system, we waited for him, and he did not come, so we knew his ship had, like others, been lost."

"He arrived only yesterday, some seventy hours ago, and explained how it had come about. He too found a solar system. But he was less fortunate than I, and while exploring this uninhabited system, far out still from the central sun, where there should have been no masses of matter, one of those rare things, a giant stony

meteor that even a magnetic shield will not stop careened into the rear of his ship. Damaged badly, barely able to move, they settled to a planet. The atmosphere was breathable, the temperature mild. But while they could navigate planetary distances, they could not return, so for nearly four and a half of your years they remained there, working, working to repair their ship.

"They have done it at last. And they have returned. And best of all, after a four-year stay there, they know all they need know about that system of eleven planets. It is compact as yours, with an ultra-light sun such as yours, and four of the planets are habitable. Together we can colonize that system! It is a system of stable heat and stable light. And it is small, yet large enough. And with the devices such as your new energy has permitted, we need never fear the stony meteors again." Gresth Gkae smiled happily. "Still better—it is inhabited only by the lowest forms of life. It is too costly to both races when Jarth sees fit to stimulate them by throwing one against the other, despite the good things that may come later."

THE END



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The Time Control

By PHILIP JACQUES BARTEL

If a man could control time he would be able to revolutionize the course of events. All sorts of phases of existence would be subject to the human will. And when an electric generator is out of control and no one can stop it, an added discord appears on the scene. But we must not tell the story in advance.

THE three commissars of Sovverg, Soviet Bureau of Energy stared at the strange scene before them with dazed expressions of disbelief.

Peter Mikhailloff, his white hair and beard bristling with excitement, turned to the three inspectors and nodded in greeting.

"My respected Comrades. I am serious, and though over eighty, am in full possession of my senses, when I say that I will now demonstrate to your satisfaction that my colleagues and I have succeeded in partially controlling time!"

Ilytch Marenin rubbed his fat chin nervously and turned to his companions. "Comrade Commissars, I fear we are wasting time. Besides—our very lives are in danger. These people are playing with voltages running up into the millions—"

"Just a moment, Marenin," broke in his fellow-inspector Boris Sarakhan. "Comrade Mikhailloff has excellent sponsors. Even Comrade Mina Boyarsky of our Secret Police, the Gay Pay Oo, supports his claims."

All eyes turned to the slight, dark-eyed brunette who was taking notes calmly, in one corner of the room. She looked up and flashed a dazzling smile to a tall, blond young American who

was busily lacing a strange-looking pair of sandals on his feet.

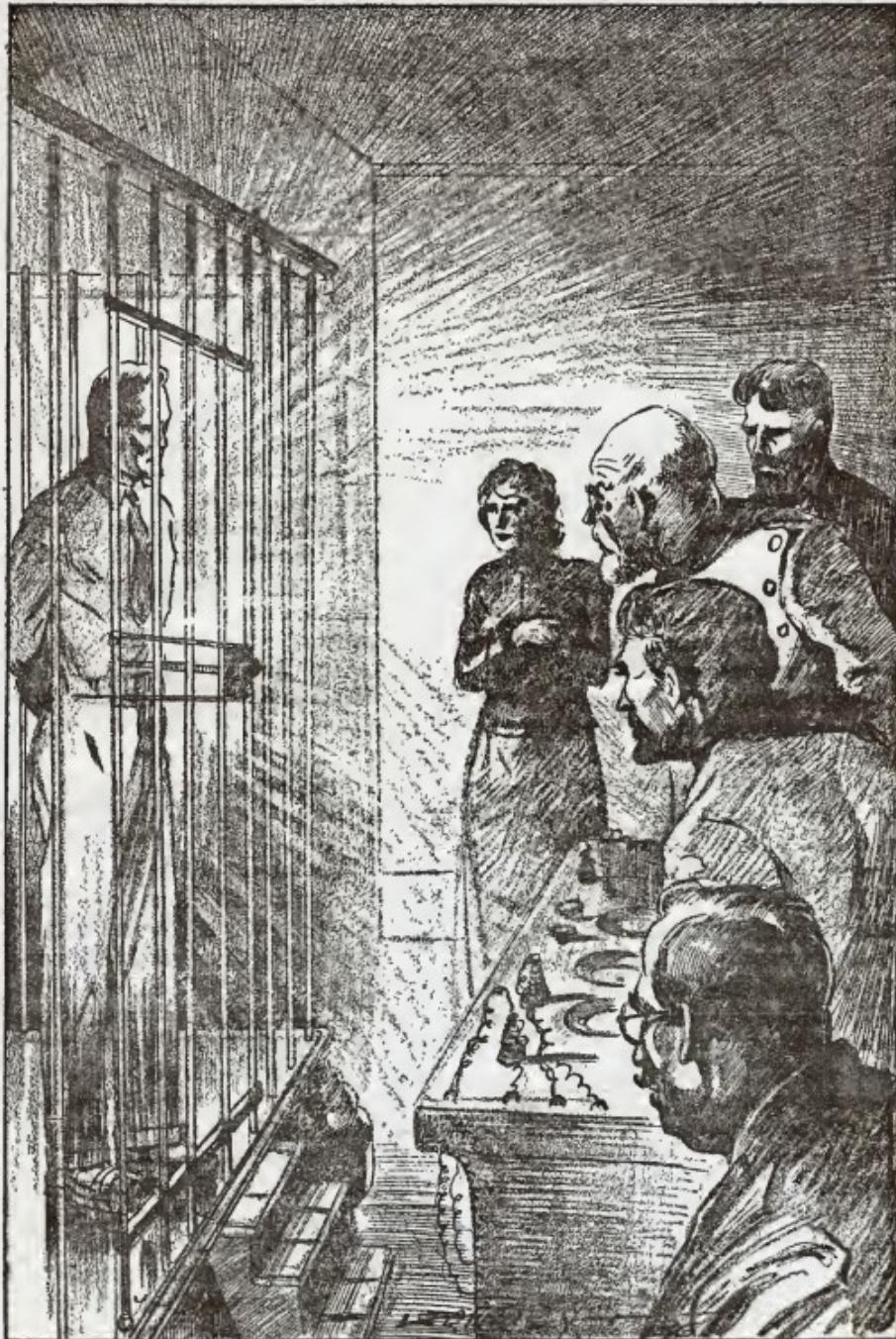
"Comrades," she began in a steady voice. "I have the fullest confidence in Comrade Mikhailloff's statements. For fifty years he has labored to perfect his theories. Every ruler of Russia, from Alexander II to our own Secretary-General Joseph Stalin, has supported him, and but a few months ago, I witnessed an experiment where two of his colleagues, Comrade Vassily Khalin and this young American engineer, Earl Lyons were projected into space—"

"My daughter," interrupted Mikhailloff quietly, "Allow me to explain to the inspectors. It will be easier.

"Years ago, I found that by bombarding a constant magnetic field through which coils of wire are moved so as to generate in the latter an alternating current, with high voltages; it was possible to remove the fourth dimension, the time element, from any organic or inorganic object!"

The inspectors gasped in bewilderment. Marenin's heavy face paled. "Y-you m-mean," he stammered, "you could remove it from the present?"

The old scientist nodded. "It would still retain the three dimensions of length, breadth and thickness, but would no longer exist in the present



The metal bars glowed with a hellish light and the smell of ozone tickled the nostrils of the entranced watchers.

sphere of time. All earthly ties of space, time and senses were suspended but one. The subject still retained his vision. He found himself able to stand off and watch TIME PASS ON FOR THE REST OF THE WORLD!"

A light of interest sparkled in Boris Sarakhan's black eyes. "Let's begin the experiment at once! If your subject can watch time go on for the rest of us; he should be able to tell us what will occur in this room hours from now or even days in advance!"

Mikhailloff's grizzled face relaxed. "Exactly, Comrades. By aid of this foresight, my associates prevented my assassination by several counter-revolutionaries a short time ago. Have we your permission to continue?"

Of the three Commissars, Marenin alone was undecided. Finally he nodded. "You may proceed, but let the experiment be a short one."

The old man pointed to a structure resembling a cage, with the bars about a foot apart. This cage rested on a thick, cork pedestal raised two feet above the ground. It was large enough to hold several people standing uprightly, without crowding.

"This enclosure," began Mikhailloff, "is really an insulated electric field of some magnitude. I am about to bombard it with a million volts—"

"Excuse me, Comrade," interrupted the third inspector, Alexis Taraskin. "Where do you obtain your power? I see no giant electric generators."

The old scientist smiled. "Until lately, that was a real problem. Our first experiment was made possible by the use of powerful steam turbines and huge Two-Pole Turbo-Alternators with rotors speeding at twenty-thousand revolutions per minute, and if it had not been for the aid and genius of our young American friend Earl Lyons, we could not have continued. He

showed us how to properly cool and insulate the rotors against high temperatures and to ease the enormous stress set up by peripheral velocities of 50,000 feet per minute.

"But now we have entirely overcome these handicaps and use power transmitted by high-pressure lines from the Dnieperstroy development." He advanced to the shelter of a screen enclosing the control board. The eyes of the three Commissars followed him fascinatedly.

Seeing that their superiors were otherwise occupied, Mina Boyarsky slipped to the side of Earl Lyons. "Earl," she whispered. "Do you have to get into that confounded machine again?"

"Yes dear," he replied. "Vassily is in Moscow at the Power Convention, and we must induce the inspectors to continue our support."

Mina sighed wearily. "If only the Central Committee would sanction our marriage. I keep dreaming nightmares in which you are lost forever in some far recess of space—"

"Hush!" he soothed, "if we win the aid of the authorities perhaps they will consent to our marriage, but first we must obtain their help. Our great work must continue!"

He finished adjusting his sandals and addressed Mikhailloff. "I'm ready sir!"

The old scientist nodded in approval.

"See, Commissars, Comrade Lyons is wearing heavy rubber shoes with soles made of a resinous composition resembling bakelite. Large charges of heavy pressure electricity will completely pass through his body. Now let us begin!"

Mina pressed Earl's hand and exchanged a glance of anxious farewell. Earl entered the cage and stood tensely awaiting developments.

Mikhailoff leaned over the panel and closed a switch. Immediately a blinding electric discharge encompassed the cage. The metal bars glowed with a hellish light and the smell of ozone tickled the nostrils of the entranced watchers.

Despite his familiarity with the sensations accompanying the experiment, Earl's flesh began to creep as he felt the usual tingling coldness move up from his toes.

HE was prepared for the usual dazzling flash of light that indicated his complete subjection. All physical sensations were gone. His eyes and brain alone functioned as before. No longer could he hear the crackle of electrical discharges. All was quiet, in the midst of this soundless inertia.

He reflected that this was the first time that he had ventured into the unknown alone. Always before, Vassily had accompanied him and he missed the company of the gloomy Russian scientist. Whenever they had gone into the cage together, they had passed the time of suspension by conversing by thought transference. Here in the realm of the fourth dimension, it was the only method of conversation.

Earl could only see directly ahead of him as he was powerless to move the muscles of his eyes in any direction. He noticed the usual clarity of vision and the way every detail stood out in bas-relief.

He regretted his inability to hear, as the occupants of the room before him were apparently engaged in an animated discussion.

In the manner of foreigners, they were all waving their arms to emphasize their speeches. However he noted the expressions on their faces. Suddenly all left the room but the

three Commissars. At an action of Marenin, the unfriendly inspector, Earl's brain vainly sent a message of surprise to his nervous system. He knew that if he had had his physical capacities, he would have gasped with surprise. A scintillating explosion of light informed him that the experiment was at an end.

AFTER the cage and its human occupant had faded from view, Commissar Taraskin closed his gaping mouth and stammered: "Mikhailoff! Can you show us if any physical sign remains of Comrade Lyons' presence? Or has he only become invisible?"

The old scientist lifted a long rubber ferrule and slowly advanced to where the cage had formerly stood. He made several passes over and through the space which had held Lyons. Nothing arrested his movements.

Taraskin and Sarakhan applauded wildly. "Imagine its possibilities!" cried the former. "We can mask the approach of troops in war!"

"And conceal attacking battleships!" added Sarakhan. "I vote we recommend the Government's support."

"Never!" It was the voice of Marenin. His fleshy face was red with anger. "This is rank charlatany! Some complicated trick. As long as I live it will never be acknowledged!"

Mina's dark eyes flashed dangerously. "Beware, Comrade Commissar," she snapped. "Your actions smack of superstition. It is my duty to report everything that occurs here. I shall spare no details of your stubbornness. You know what the Executive Council thinks of treasonable non-co-operation. What have you against its ac-

ceptance? Why shouldn't it receive your aid?"

Marenin sneered at his challenger. "Comrade Boyarsky, though you are a member of the secret police, you have no power over the decisions of this tribunal. We must all be of one mind. Even though my two colleagues favor your appeal, I deny it. It is not necessary that I give any reason for my ruling, and I hereby order you, Peter Mikhailloff to dismantle and destroy your apparatus within twenty-four hours. The American engineer and your other assistants will be transferred to our latest power project in Ukraine. Now conclude the experiment that I may repeat my instructions to Comrade Lyons."

The aged scientist's shoulders dropped dejectedly. Mina's fists clenched in exasperation. Slowly Mikhailloff retarded a rheostat and the crackling of electrical discharges died to silence.

Mina's tense lips softened with relief as she saw Earl's figure reappear. He sprang from the cage and caught her in his arms.

Before he could say anything of his experiences, Marenin came to his feet and announced: "Comrade Lyons, this tribunal has refused to advise your continued support. This plant must be demolished by this hour tomorrow. No appeal can be made."

Earl's grey eyes narrowed curiously. Instead of becoming angry he flashed a quick wink in Mina's direction and said. "If there is no objection I should like to withdraw into an anteroom with Comrade Mikhailloff and Miss Boyarsky."

Sullenly, Marenin nodded. His colleagues regarded him helplessly and shrugged their shoulders.

Wondering at Earl's strange re-

quest, Mina and the old man followed him to an adjoining room.

When the door had been closed behind them, Mina grasped Earl's arm. "What can we do?" she asked. "Marenin is as obstinate as a old-time bourgeois peasant."

"Fifty years of incessant labor for nothing!" groaned Mikhailloff. "The stupid bureaucrat!"

Earl smiled mysteriously. "Do you think the others would help us if Marenin were er-er away?"

"Of course," replied Mina and Mikhailloff in one voice.

"Then listen," whispered the American. "I was under suspension for but a few moments, wasn't I?"

They nodded eagerly.

"We must find some way to exactly control our machine," he began excitedly, "for unless I was imagining things, we'll have no further trouble with Marenin. In the short time I was in the cage, I could see only a little, way into the future. But what I did see was enough. MARENIN IS ABOUT DUE FOR A FATAL HEART ATTACK!"

A loud cry and the heavy thud of a falling body in the next room immediately followed his ominous statement!

WITH Marenin out of the way all was simple. Moscow voted funds and labor with generous hands. The work went on, in leaps and bounds.

Earl wearily leaned back from a close inspection of a projected improvement to their apparatus. He yawned and turned to Vassily Khalin, whose brown face was wrinkled in deep thought.

"What's bothering you Vassily?" asked the American.

Khalin scowled. "The news I heard in Moscow. There's trouble brewing in the Far East."

"Why worry about the Far East? We're getting along fine here. They're sending us plenty of men and money. In a few months we'll have this new model of Mikhailloff's finished and we'll be able to travel ahead in time at a governed speed."

The Russian looked up impatiently. "Don't you see, you fool!" he snapped angrily.

Earl regarded him in surprise. "Why no. What do you mean?"

"There's a Treaty Conference due next week in Moscow. Japan has agreed to send a representative but promises nothing. If she refuses to sign the Peace Treaty, it means war. Russia doesn't want war, at least not yet. She isn't prepared for it. We'd rather spend the money for industrial development and the betterment of the conditions of our people. If we have to fight, it means the end of all our experiments, perhaps forever."

Earl pursed his lips in a silent whistle of surprise. "So that's why Mina was called to Moscow last night. I thought she went to try for our permission to marry."

Vassily nodded grimly. "If there's war, she'll be put to work immediately in the counter-espionage department. You'll never see her—"

"He won't, eh?" came a clear voice from the doorway.

Earl sprang from his chair and ran to greet his fiancee. The Russian regarded them balefully. "What's news from Moscow?" he rasped.

Mina's smooth features clouded. "We don't know," she sighed. "It all depends on what happens at the Treaty Conference. If it's war, no permission will be given to members of Gay Pay Oo to marry, and I'm afraid you'll get no further support here."

Earl's active brain began to attack the germ of an astounding idea.

"Where is the conference to be held in Moscow?"

"At the Administrative Building in the Kremlin. Why do you ask?"

The American smiled but said nothing.

"Come, Earl," begged Mina, "If you have an idea, let's have it now, not later."

Vassily looked at him questioningly.

Peter Mikhailloff entered at this moment, his old eyes bright with interest. "It works, my friends. The new attachment is a success—" He glanced at the assemblage. "Why all the gloom?"

Mina related the news from Moscow.

The old man shrugged his shoulders. "In the past fifty years we've had many revolutions and plenty of wars. It made no difference to me. My work went on uninterrupted."

Earl drew nearer and stared into Mikhailloff's eyes. "But suppose we could prevent *this* war?"

"How?" asked Mina. The others looked their puzzlement.

"Why not install one of our time projectors in the conference room and see for ourselves just what the outcome of the Treaty Council will be?"

Vassily smashed his fist on the table. "Marvelous!" he gasped.

Mina looked up proudly at her sweetheart and smiled with satisfaction. Mikhailloff beamed approvingly.

They should have saved their rejoicing until after the experiment and perhaps they would have been prepared for the disappointment that followed.

THE day before the conference, the council-chamber in the Administrative Building was bare and quiet. On the balcony that completely extended around the hall, Earl was supervising the installation of a small

booth, which greatly resembled a motion-picture projection cell back home in the States.

He watched the final bolting of heavy apparatus to the floor and turned to Mina. "Well, sweet, everything seems ready. We have exactly twenty-four hours time before the council begins. According to my figures which have been closely checked by Vassily and Peter, I must remain in uninterrupted suspension for about one hour. The nearest ratio we have developed is one to twenty-four. Then I shall see what I shall see."

The girl's eyes darkened with a sad thought. She turned away to conceal her nervousness, but not before Earl noticed it.

"What's the matter, dear?" he asked anxiously.

"N-nothing," she sighed, "but somehow I feel that something may go wrong. Can't I go along with you?"

Earl laughed. "No, not this time."

"Then, why not take Vassily? I'd feel better if I knew you were not alone."

"Very well," he agreed. "If Vassily will consent to come along I'll take him."

Vassily quickly agreed when he was asked, although Earl knew that the Russian disliked these little trips ahead in time.

The moment Mikhailloff signaled from an adjoining building that all was in readiness, Earl and Vassily entered the booth. The walls were removed and they found themselves in a small counterpart of the cage in their home laboratory.

Mina threw them a kiss and pressed the button for Mikhailloff to begin.

After the usual dazzling preliminaries, the men settled down for a long wait. The first message that Earl

flashed to Vassily was: "(Well, old timer, I'm glad that I won't feel the strain of being on my feet for twenty-four hours.)"

"(Enough of this unseemly joking. Let's watch what's happening. Are you sure the ratio is one to twenty-four?)"

"(Positively, Vassily. We'll have to watch closely or in the speed of transition, we may miss something of importance.)"

"(Comrade Earl, look. The men are preparing to clean the hall. See how swiftly they work with their brooms and mops.)"

"(Why, Vassily, it seemed to take only a second. They are all finished!)"

"(There's Comrade Varenikoff. He's looking over the place to see if it is ready for the conference guests. He seems satisfied.)"

Things were progressing rapidly. Earl made a mental resolution to refrain from using that ratio in the future.

Vassily read his thoughts immediately. "(What we should have done was to accelerate the speed for about twenty hours and then decellerate it to something just a little quicker than normal.)"

"(You're right, Vassily, but it's too late now. Pay strict attention. I may miss something.)"

Slowly, the delegates began to arrive and take their chosen seats. As a new envoy would enter, the entire assemblage would come to their feet and bow.

At once a huge, clumsy figure entered, resplendent in afternoon clothes. He was greeted by stiff nods. The watchers could see that he was none too popular.

"(Look, Earl. It is Anton Yousoff. If it were not for his popularity with

the Agriculturalists, he would not be here today. As a diplomat he is the greatest boor in the Union. Quick of temper, he is as friendly as a Siberian wild-cat.)"

"(He is sitting right next to the Commissar of the Interior. I hope he keeps his vulgar mouth shut, Vassily, or anything may happen.)"

Suddenly all stood up. A tall, slim ascetic-looking man joined them. He bowed and shook hands with several of the delegates.

"(Who is he, Vassily?)"

"(It's Shito Kanuchi, the Japanese Envoy! Watch him closely. Study every movement of his features! He is the man we have to worry about.)"

The conference began and progressed rapidly. Several problems seemed to come up and were quickly settled. At once, the watchers saw a look of tenseness come over the faces of the diplomats. Anton Yousopoff was on his feet gesticulating wildly. His face was purple with anger. Vainly, his compatriot, the Commissar of the Interior tried to calm him, but the exhibition of vulgarity went on.

Now Kanuchi stood up and gracefully motioned for quiet but without effect. In a burst of uncontrolled fury, Yousopoff hurled a heavy inkwell into the Japanese's dignified face!

The watchers could hear nothing, but they imagined the uproar. However it lasted but a moment as Kanuchi lifted the unsigned Peace treaty in his long-fingered, well-kept hands and tore it across.

Without troubling himself to wipe the ink from his face, he bent over the table and with tightly drawn lips framed the single word: WAR!

The burst of radiance that signalled the end of the suspension blotted out the rest of the scene from the watchers' eyes.

MINA was still waiting, watch in hand. "You're right on time," she greeted them. "What happened? Anything important?"

Vassily and Earl regarded each other seriously. Without the benefit of mental telepathy, each knew what the other thought.

The door was thrown open and Mikhailloff dashed in. His face cleared on seeing the men well and safe.

Mina's intuition told her all was not right. She took Earl's hand between her soft palms and asked. "What happened, dear? Did something go wrong?"

In a few words Earl related what had occurred.

"—and without a doubt," he continued, "war was the result."

"Everything went along nicely until Yousopoff went wild," added Vassily.

"Then we're in for trouble?" asked Mikhailloff.

Vassily nodded sadly.

"Can nothing be done?" begged Mina. "I have the entire Gay Pay Oo at my command for the duration of the conference. Is there no way that I can help?"

A sudden light burst into Earl's keen mind. His eyes narrowed as he turned over the idea carefully. His jaw squared as a daring plan began to form itself.

Mikhailloff regarded the American closely. "What brilliant thought have you now, my son?"

Earl made a strenuous attempt to restrain his enthusiasm. "Listen friends! Do you recall that day in the laboratory, when Vassily and I had that 'preview' of Mikhailloff's death?"

"Yes!" pressed his listeners.

"Don't you see! The fact that we saw him die didn't prevent us from stopping his assassination, did it?"

His audience was speechless with astonishment.

Earl went on: "Since then, it has been my theory that time is nothing but undirected vibrations of some unknown source. Vibrations which when left alone, follow certain paths. BUT WE KNOW NOW THAT THEY CAN BE DIRECTED AND CONTROLLED!"

The American's eyes flashed with zeal as he spoke. "Mina! Have Anton Yousopoff arrested on some charge. Make him the victim of one of your Gay Pay Oo midnight raids. Anything, just so he is kept from attending the Treaty Conference!"

The girl's eyes widened with excitement. "I will!" she cried. "It may cost me my position, but then if I do lose it, I won't need permission to marry you!"

She kissed Earl and dashed from the room.

The men sat silently until she returned. "It has been so ordered!" she announced.

But Earl was not finished. "Vassily, in order to study the control of these time vibrations, what do you say to another little trip to see what the new version of the Treaty Conference will be?"

Vassily looked uneasy and was about to object when Mina spoke up: "Why not take *me* Earl?"

The Russian relaxed. "Yes, why not take Mina?" he echoed.

It was Earl's turn to object. "But there's always the chance of an accident—"

"All the more reason for me to be with you," was Mina's reply.

"Very well, then," he conceded. "Let's enter the cage. Oh! Comrade Mikhailloff! How about a one to twenty-four ratio for the first half hour and then a normal advance until the

end of the period? We're not interested in the next twelve hours or so. It's what happens afterwards that counts."

Mikhailloff nodded in approval. "You're correct, my son."

The old man waved his hands in farewell and left to attend to the machinery. Vassily yawned and said that he would return in an hour to greet them on their arrival and the couple were left by themselves.

"Don't mind the flashes of light, Mina," he cautioned, "and if you can't feel your muscles or move your limbs, it's perfectly all right. Here you enter first." He lifted her to the cage. As he was about to follow, his eyes fell upon a heavily insulated cable attached to an outlet from the cell. Somehow it had worked loose from its binding post! For a second he was frozen to immobility!

In the next instant he had sprung from the cage and approached it, with the desperate hope that it was not too late.

Mina watched him, awed with a premonition of danger. In a flash he had the loosened part in his hand and had begun to tighten it when the power was turned on!

Like a writhing serpent the cable flew from his hand and the air was filled with the familiar electrical discharge. The cage began its voyage to the future. A sharp scream came to his ears. He raised his eyes. Mina's beloved features were fading fast.

Quickly he ran to the basement where a strange sight met his eyes. Mikhailloff and Vassily were jumping from one instrument to another, yelling aimless instructions and gesticulating wildly.

"Stop that damned machine—quick!" Earl shouted.

Vassily stopped and grasped Earl's

shoulders. "That's the trouble!" he panted, "We can't! Something's happened to the controls!"

ACOLD hand grasped Earl's dry throat. For the first time in his life he knew abject fear. He dashed to the telephone and called the Moscow Central Power Terminal. The minute that it took for his connection seemed a week. "Hullo! This is Lyons, comrade, of SOVERG. At once, cut the main feed-line on Division A!" He tossed the telephone to the floor and dragged Mikhailoff to the Council-Chamber.

The scene was as before. Crackling electric discharges still filled the air. Earl pivotted and faced Mikhailoff.

"What happened, Peter? Tell me! Mina is in there! Helpless—perhaps lost!"

The old man's voice trembled with feeling as he gathered his scattered wits for a reply. "I w-w-as adjusting the ratio you wanted," he stammered weakly, "when it happened. The handle on the rheostat broke off and the ratio-calculating head snapped, releasing the guide-spring!"

Earl's face became deathly white. "You mean you don't know at what speed Mina is travelling in time?"

The Russian could only nod.

At once the crackling died down and the cage began to reappear. Hardly had the bars regained their opacity when Earl jumped to its door. Mina stood there, her slight form swaying from side to side. As Earl reached her, she tottered and fell into his powerful arms.

Hungrily he crushed her soft body to his breast. For a while he had doubted if he ever would see her again.

At a soft sigh, he looked down. Her warm, dark eyes were open. Her tender lips parted and she murmured. "Darling, don't worry. Everything will be all right. Your plan worked. There won't be any war. Kanuchi signed the treaty."

Earl bent to kiss her and was barely able to hear her next words. "Then I saw the most wonderful thing in the world. I don't know how much later it was—things were whirling so fast—but I witnessed our marriage—here in the Council Hall—and it was a grand, State affair!"

THE END

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PROBAIK JUNIOR

The Space Marines and the Slavers

By BOB OLSEN

It is some time since we have had the pleasure of presenting one of Bob Olsen's stories, and we can promise our readers that they will be greatly pleased by this one.

CHAPTER I

THE SACKED VILLAGE

CAPTAIN FRANK BRINK, commander of the rocket ship Hyperion, looked up from the log book in which he was writing a voluminous report describing how the so-called "Space Marines" had successfully mediated a strike of the platinum miners on Jupiter's satellite, Io. Whistling a familiar air, he glanced casually through the heavily insulated, transparent floor of the space ship's control room. What he saw must have startled him, for he suddenly stopped whistling, and yelled, "Hi, there, Dan! Aren't you away off the course?"

Ensign Daniel Mayer was a recent addition to the ranks of the universe-famous Earth Republic Space Navy, having graduated with high honors from the Interplanetary College of Cosmonautics only two years previous. Obviously virile, despite a trim, medium sized figure and a face that was almost too handsome for a man, he looked out upon the world through grey eyes which could either be as grim as a gun muzzle or as playful as a Maltese Kitten.

But there was neither humor nor

determination in those steely eyes of his when, in response to his commander's query, he turned around as far as the straps of the control seat would permit him. The expression in them was more like that of a callow youth who has been caught experimenting with his father's electric razor.

Although he had heard the question clearly, he sparred for time by saying, "I beg your pardon, Chief. Did you address me?"

"Did I address you?" Brink sputtered. "No, you goop, I didn't address you. I only asked you if you aren't away off the course. Unless my eyesight has become obfuscated in my old age, that Lake on the under port bow is Tolako. Am I right or am I incorrect?"

Mayer grinned sheepishly and admitted, "Your eyesight is A. Z., Chief. That is Lake Tolako."

"But I thought I told you to set your course for the space-base. What's the idea of circumnavigating Ganymede to get there?"

"Well, you see, Chief," the Ensign alibied, "I've never seen this half of the satellite. Some day I may have to set the ship down on the Western Hemisphere. I thought it would be a



It will be up to you five men to figure that out, Sullivan told him. You know more about this planet and the habits of the inhabitants than I do.

good idea for me to familiarize myself with the terrain. It will take only a minute or two more and I didn't think you'd mind."

"Why don't you tell him the real reason, Dan?"

This disconcerting remark came from the third occupant of the space ship, Lieutenant James Sullivan.

Tall, muscular, with Celtic features and a weather-beaten, saddle-colored skin, Sullivan was reclining languidly in a padded hammock stretched across the control room. Suspended weightlessly a few inches above his chest a peculiar object hovered. Composed of small pieces of metal, it was shaped like a large apple from which some ravenous boy had taken several generous bites. Anyone, who was familiar with the fads of the day, would have recognized it as a three-dimensional, magnetic "jig-saw" puzzle.

From a basket which was also floating in midair, Sullivan selected a tiny section of iron and attempted to fit it into a niche of approximately the same shape. With a grunt of disgusted negation, he put the piece back in the basket and tried another one.

For a few seconds nobody spoke. Apparently Mayer had decided to ignore Sullivan's impertinent question.

It remained for Captain Brink to ask, "What do you mean, Jimmy? Why do you think Dan wants to circumnavigate Ganymede?"

"If you really desire to know," Sullivan told him, "Dave's real interest is not so much in the landscape as in the inhabitants of the Ganymede's Western Hemisphere—or perhaps I should have said in one certain inhabitant."

"I still don't integrate with you," the captain rejoined. "You are getting so woozy about puzzles that you even talk that way."

"Then permit me to elucidate. Doubtless you recall that, when Dan arrived on Ganymede a few months ago one of his fellow passengers aboard the space liner was a certain pulchritudinous and flavigomous female by the name of Ingeborg Andersen."

"Oh, you mean the daughter of Lars Andersen, the missionary."

"Herself in person. I understand that during the space flight from Mother Earth to Jupiter's fair satellite, a very sweet little romance developed between the said blonde Nordic and our mutual friend, Ensign Mayer. Perhaps you haven't noticed that he even carries her portrait inside the cover of his gravinul."

"Isn't anything sacred from your prying eyes?" Dan growled. Then to Captain Brink he said, "Jimmy is right, Chief. Miss Andersen is my principal reason for wanting to come this way. You see, I've had a sort of premonition—an intuition of impending danger or—"

"A what?" Brink yelled.

"Well, a sort of hunch that the mission—" Mayer bit off his sentence in the middle and then went on: "Nothing would please me better than to find out that my fears are unfounded, but I just couldn't resist the temptation to make sure. I hope you don't mind, Chief."

Before Brink could answer, Sullivan interposed with: "Of course he doesn't mind! After all, Captain Brink is human, you know, and I understand that even he was young and romantic once upon a time."

Brink grunted and muttered, "A. Z., Dave. Go ahead and treat yourself to as much Norwegian blonde as you can see from an altitude of fifty kilometers. You understand, of course, that we cannot descend any lower than

that until the rocket brakes have been turned on."

"Of course, Chief," was Mayer's grateful response. "Thanks for your permission. I believe I can see enough in the televue either to confirm or to disprove my premonitions." Then, as an afterthought, he added, "I hope it will be the latter."

LIKE all modern spaceships, the Hyperion was equipped with a high powered televue which not only magnified but also amplified the images of distant objects in much the same way that an old-fashioned radio set amplifies sound.

Keeping his eyes fixed on a crystal sphere about a foot in diameter, which bulged out from the complicated instrument board, Mayer adjusted two purple-colored dials. Presently the transparent globe seemed to become alive with swirling lights and shadows. Out of the flickering confusion a remarkably life-like, three dimensional image in natural colors soon materialized.

A few seconds of careful scanning focussed the televue on a clearing which nudged into the dense forest surrounding Lake Tolako. The image had hardly become distinct when Mayer uttered an exclamation which made both his space shipmates jump.

"What's the matter, Dan?" Sullivan gasped as he tumbled out of his hammock and, pulling himself hand over hand along the side rail, hurried to Mayer's side.

Captain Brink was a split-instant ahead of him.

"Something wrong?" he asked anxiously.

Mayer simply pointed at the objective of the televue. That really wasn't necessary, for both the others

were already staring at the crystal sphere, their eyes protuberant with horror.

In the spot where there should have been a picturesque village with happy men, women and children, working and playing among neat rows of hexagonal houses, the televue revealed nothing but a desolation of smoldering embers, with which were jumbled hundreds of grotesquely sprawling bodies. Not a hut remained standing. Not a moving creature could be discerned.

Lieutenant Sullivan uttered a low oath in a tone which made it sound like a reverent prayer.

Ensign Mayer was silent, but the look of anguish, which distorted his handsome features, betrayed his feeling far more vividly than any words could have done.

Captain Brink was the only one of the trio who retained his normal composure. Speaking softly and gently, he said: "Excuse me, Dan. Better let me take the controls. You crawl into the hammock until you get a grip on yourself." Then to Sullivan he yelled: "Hi, Jimmy! You man the rocket brakes. We're going to set her down!"

So terrific was the speed of the spaceship that it took several minutes for the powerful rockets to decelerate the velocity sufficiently to make a safe landing possible. Meanwhile Captain Brink maneuvered the craft in a wide spiral. Finally he turned on the gravinul which nullified the gravitational attraction of the satellite just enough to enable him to set the huge flyer down as gently as a leaf falling on the bosom of the lake.

Leaving to Lieutenant Sullivan the task of guarding the spaceship, Brink quietly requested Mayer to accompany him in his inspection of the stricken village.

What they saw on the ground was infinitely more horrible than the images which the televiwer revealed. Although the lifeless bodies which studded the blackened clearing were swollen and bloated, the two earthmen easily recognized the furry skins and rabbit-like ears of the native Ganymedians.

Totally unaccustomed to viewing sights as grawsome as this, Mayer was dismayed to feel himself becoming terribly nauseated. It was like space-sickness—almost the same sensation he had experienced on his first flight in the space-flyer. Nevertheless he forced himself to continue the search. He found the body of Lars Andersen, horribly mangled and mutilated, but of the missionary's daughter he could not discover a trace. When it became certain that her body was not among the victims, he hardly knew whether to hope or to despair.

"Well, Dan," Captain Brink muttered after the search had been completed. "The girl isn't here. That's certain."

"Then what could have— Where can—"

Brink took one look at his fellow officer's greenish-hued face and exclaimed: "Look here, man! You're sick! Better get back to the spaceship and lie down in your hammock."

"But—"

"Never mind any buts." Brink took Dan's arm and half led, half dragged him to the Hyperion.

"Let me go back," Mayer begged. "There must be some trace—some clue—"

"No doubt there is," Brink concurred. "But neither you nor I can find the clues and interpret them the way Jim can. He's the best puzzle-solver in the Solar System."

Turning to Sullivan, the Captain or-

dered: "Take a look around, will you, Jim. See if you can figure out what happened. Dan and I will stay in the ship."

CHAPTER II

THE SPACE MARINES TAKE A HAND

SULLIVAN was gone for nearly an hour. When he returned to the space-ship, Captain Brink sat down at the controls and hopped off. He waited until he had reached an altitude of twenty kilometers before he spoke. The question which he asked was a complimentary indication of his high regard for his lieutenant's deductive skill. It was not, "Did you find out anything?" His query was, "Who did it?"

Jim answered in one word—a proper noun. It was, "Zurek."

"Zurek?" Mayer echoed.

"Zurek is the Martian word for weasel," Brink explained. "It's a sort of title of affection which has been bestowed on a certain prominent public enemy of the solar system. He's an outlaw, wholesale murderer and general, all-around blackguard."

"But why did— What motive could he possibly have for perpetrating—" Mayer paused, groping for words which would adequately express his reprobation.

"His motive is plain enough," Sullivan volunteered. "Obviously it was a slaving expedition."

"How can you be so certain of that?" Dan challenged.

"Couldn't you figure that out for yourself?" Sullivan asked, a bit impatiently. "Didn't you notice that there were no young men or women and very few children among the corpses?"

"Now that you remind me, I do recall that most of the bodies were of

elderly people," Mayer acceded. "I suppose you inferred from that circumstance that the younger people were taken away alive."

"What other inference could any intelligent person adopt?" Sullivan demanded.

"None," Dan had to admit. "But if this raid was perpetrated solely for the purpose of capturing slaves, why were all the weaklings and elderly persons tortured and killed?"

"Why does a weasel kill ten times as much game as it can possibly use for food?" was Sullivan's countering question. Without waiting for a reply, he went on: "There was a good reason why Zurek was christened the Weasel. His past record indicates that he is a super-sadist. He kills just for the fun of it. Probably gets a kick out of seeing his victims squirm."

"How horrible!" Dan exclaimed.

"Worse than horrible," Jim said. "It's unspeakable. You noticed of course that the bodies were bloated and mangled."

A look of anguish swept across Dan's handsome features and he closed his eyes as if to shut out the frightful sights which still haunted his memory.

"Yes," he almost whispered. "Some of them looked as if—as if they had exploded."

"Only a Martian electrolysis beam gun could have done that," Sullivan declared. "You've heard of them, of course."

"I've heard a little bit about those devilish contrivances, but I can't say I know much about them," Dan admitted. "Why do they call them electrolysis beam guns?"

"Because they shoot out a powerful beam which has an electrolytic action on fluids inside the bodies at which they are aimed. You can readily un-

derstand the terrible effect that would produce on a human body."

"You mean it changes the water in the blood into hydrogen and oxygen?"

"Precisely. The pressure of these gases on the walls of the veins and arteries produces frightful torture which lasts until it is ended by a terrible but merciful death."

Mayer uttered an exclamation of horror and said, "But I thought weapons like that were outlawed at the Interplanetary Humanitarian Conference away back in 2734."

"They were, but that wouldn't stop a skunk like Zurek from using them."

"Have you any other evidence that Zurek did this?" Dan asked.

"Plenty!" Sullivan told him. "Here! Take a look at these."

He unfolded his handkerchief and spread it out on the chart-table.

Mayer expected to see some startling clues, such as a weapon, a projectile or an article of jewelry. Instead, the opened handkerchief revealed only a chunk of grey dirt, a wrinkled scrap of colored paper and a piece of curiously bent wire.

WITH pucker'd brow and opened mouth, Dan stared at these insignificant-looking objects, but he made no comment.

"I found the place where the space-flyer landed," Sullivan explained. "It's about half a kilometer from the village. As you know, every rocket ship leaves distinctive marks in the soil when it takes off. The craft that brought the slavers to Ganymede was of Martian manufacture—a Krovenka to be exact."

"But that doesn't prove that the flyer was manned by Martians," Mayer reminded him. "The Krovenka" is a popular make. They are used all over the Solar System. I

even know several Terrestrials who own Krovenkas."

"True enough," Jim conceded. "Nevertheless I have strong reasons for believing that this particular Krovenka came here direct from Mars. Do you see this chunk of clay? I dug it up from the place where the soil was pressed down by the flyer's landing gear. What do you make of it?"

Mayer examined the dirt, shook his head and said: "I'm afraid it doesn't mean a thing to me. What do *you* make of it," Jim?"

"Notice these purple specks?" Sullivan said, pointing to the clod.

Dan nodded.

"Now feel them."

Mayer did as he was bid.

"Ouch!" he yelled. "They're like tiny splinters of glass."

"Precisely," Jim grinned. "It's a sand composed of eroded, basaltic rock. Observe the peculiar, purplish color. To me that spells Zurek."

"I don't get you yet," Mayer confessed.

"I know of only one place where sand like that is found, and that is in the Martian Desert of Menfol. Of course I haven't explored every remote corner of the solar system, but I have visited most of the spaceports. The only one I know of where purple, vitreous sand like this is found is at Menfol. You know of course that the knave's roost which Zurek presides over is located there."

"But how do you account for the presence of the purple sand in this chunk of mud?"

"Don't you understand? When Zurek took off from Menfol, some of the sharp particles stuck to his landing gear. The place where he grounded on Ganymede has a heavy clayey soil to which the sand adhered.

That proves pretty plainly that the flyer came from Menfol."

"Granted. But even that doesn't positively implicate Zurek."

"Maybe not, but, combined with these other clues it does." He pointed to the fragment of paper and the twisted wire."

"Better elucidate," Dan grinned. "I never was any good at solving puzzles."

"This," Sullivan explained, "is a piece of the wrapper from a package of *vorgot*. It's a rare drug which is mixed with a substance resembling chicle and is chewed like chewing gum. I happen to know that Zurek is a *vorgot* addict."

Picking up the wire he added: "This thing-a-goop cinches it. Ever see one before?"

Dan shook his head.

"It's a beard clip," Sullivan told him. "Zurek takes great pride in his whiskers, you know. He plaits them very artistically. To keep them from unraveling, he clips the ends in place with jiggers like this."

He waited an instant to let this sink in, then he went on: "Individually, of course, none of these clues prove much, but when they are all integrated the answer is Zurek."

By this time, Captain Brink had gained enough altitude so that he could take his attention away from the controls for a while.

"Hey, Jim," he called. "If you're through with your lecture on how to become a great cosmic sleuth in six easy lessons, suppose you call the Colonel and turn in a preliminary report of the massacre."

"O.K., Chief!"

Sullivan adjusted a dial on his short distance visaphone, a small, flat object shaped like a cigarette case which was fastened to the straps of his

service belt where they crossed his chest.

"Calling Colonel Steiner, E.R.S.N.," he droned softly, "calling Colonel Steiner."

Presently a voice which seemed to come from within the space-flyer said, "Steiner answering!"

Floating without support in the center of the cabin, a marvelously life-like, three dimensional image of a human face appeared. It was the face of an old man, furrowed and weather-beaten; yet the eyes glowed with an alert, fresh vigor which is usually associated only with youth.

In succinct, crisp sentences, Sullivan described the finding of the ravished village and of his subsequent investigation. He ended with, "Any orders, Colonel?"

"None, other than the orders you already have received," the commanding officer replied. "I would like to have all three of you report to me as soon as you set your ship down at Headquarters Spacebase."

CHAPTER III A BOLD PROPOSAL

HALF an hour later, when Brink, Sullivan and Mayer were seated about the steel-alloy desk in Colonel Steiner's simply furnished office, the Captain of the Hyperion furnished his commanding officer with the details which had been omitted from his lieutenant's visa-phone report. To Sullivan he left the task of explaining the conclusions he had reached as a result of the investigation he had made at the scene of the massacre.

As the recital progressed, the expression on Colonel's stern but kindly face became graver and graver. When

all the salient information had been transmitted to him, he shook his head and said: "How horrible! And the worst of it is that we can't do anything about it."

Mayer leaped to his feet, his face flushed with anger, and cried, "What do you mean, we can't do anything about it?"

Steiner stared at him in astonishment, but before he could utter a word of reproof, the Ensign, realizing that he had committed a flagrant breach of discipline, hastened to apologize: "Oh, I beg your pardon, sir! I forgot myself. Please forgive me."

Without speaking, Steiner turned his questioning eyes on Captain Brink as if in anticipation of the enlightenment, which the superior officer was ready to give him, concerning his associate's conduct.

"Ensign Mayer has been through a severe ordeal, Colonel," he explained. "You see he has a very special interest in Miss Andersen."

"Ah, now I begin to understand," the Colonel said in a sympathetic voice. Turning to Dan, he added, "I don't wonder that you are upset, Ensign Mayer. The mere thought of a loved one being in the power of a fiend like Zurek is enough to make any red-blooded Terrestrial forget himself. Unfortunately, however, as I said before, there is nothing we can do about it."

"But, surely, Colonel—if you will pardon my saying so, sir—there must be some way to save her from this unspeakable Martian. Ingeborg Andersen is a citizen of the Earth Republic. Furthermore, she is a Christian Missionary. Can there be any doubt about these two statements, sir?"

"Of course not, my boy. And may I suggest that it is not necessary for

you to shout. I can hear you perfectly well if you speak in an ordinary voice."

"Please pardon me, sir," Mayer apologized. "What I am trying to get at is this: When I received my commission I was told that it was the duty of the Earth Republic Space Navy to safeguard the life and liberty of every Earth Republic citizen and every Christian—no matter where he or she might be in the Universe. Am I not right, therefore, in declaring that it is our duty to do everything in our power to save Miss Andersen from her abductors?"

"Of course you are right," the Colonel admitted. "But even the Space Navy cannot achieve the impossible."

"Again asking your pardon, sir; but it is hardly necessary to remind Colonel Alexander that the Space Marines are famous for accomplishing tasks which at the outset seemed impossible."

"True enough," Steiner conceded. "But in this case the obstacles are of much more formidable and serious character than we have ever previously encountered. Before I amplify this statement I must caution all of you that everything said here must be kept in strictest confidence."

The three younger officers nodded and Steiner went on, "There are strong reasons for believing that the military leaders of Mars are deliberately planning to invade certain of the more desirable portions of the Earth Republic for the purpose of annexation and colonization. Mars is ready right now—spoiling to start hostilities. For fear of incurring the enmity of Venus and the other states of the Solar System, Mars doesn't dare to employ the usual, ruthless, Martian system of attacking without warning and without reason. For

some time they have been looking for an excuse to start hostilities. They know that the earth is not prepared for war now, but that our scientists and our manufacturers are quickly building up defensive armaments. Hence, from the standpoint of Mars, it is imperative that the excuse to declare war shall be found as soon as possible. In the interests of the Earth Republic it is equally vital that no such excuse shall be created. That's why it is particularly important that the E. R. Space Navy shall watch their space flights even more carefully than ever. Do I make myself clear?"

"Yes, but—" Mayer started to say.

He was interrupted by Sullivan, who said: "Pardon me, Dan. I suppose you heard what happened to Cummings and Lindskov and Christopher just a few days ago."

"All I know is that they went on a secret mission and never came back," Mayer answered.

"They were caught by Martian Intelligence Officers," Colonel Steiner told him. "The detectives claimed that they found motion pictures of the new Martian Spacedreadnaughts in the possession of Cummings. The other two were implicated as his assistants. All three of them were summarily executed—after the customary Martian session of refined torture, of course."

"What an unspeakable outrage!" Mayer exclaimed. "They must have been innocent. Officers of the Space Navy are not spies!"

"Don't be so sure of that," Steiner contradicted him. "It happens that Cummings and Lindskov and Christopher were sent on a special mission, and that mission—to use a plain, ugly word—was espionage. This, of course, had to be denied by the E. R. S. N. staff and by the Earth Republic Am-

bassadors to Mars. But they didn't fool the Martians. Orders were subsequently issued that no Earth Republic rocket ships would be permitted to land on Martian soil. It is generally understood that any member of the E. R. Space Navy who gets caught on Mars will be summarily tortured and put to death without even the formality of a trial. Do you understand now why there is no possibility of our sending an expedition to save Miss Andersen?"

Instead of answering this question, Mayer asked another one: "You think that Zurek will take Miss Andersen to Mars?"

"Yes," Steiner affirmed. "In consideration of the facts brought out in Lieutenant Sullivan's report, there can be little doubt of that. Unquestionably the purpose of the raid was to capture slaves. There is only one place in the Solar System where public barter of slaves is condoned, and that is on Mars."

"But isn't there a possibility that we could overtake and apprehend Zurek before he reaches Mars?"

The Colonel smiled tolerantly and said: "I don't think you would make a suggestion of that sort if you stopped to reason it out intelligently. You must know, for instance, that the mere task of locating Zurek's flyer would be like hunting for a champagne cork floating in the middle of the Pacific Ocean. I won't say that it is absolutely impossible, but unless we were miraculously lucky it would take so much time to find him, that Zurek would be safe at home before we could even commence to pursue him."

He stopped for a moment to light his pipe, and then went on: "Even if we knew exactly where Zurek is right now, I'm afraid we wouldn't have a chance to overtake him. To be sure,

the Hyperion is a trifle faster than his Krovenka, but it isn't nearly speedy enough to overcome the enormous head start which he already must have. You realize this, do you not?"

"Yes, Sir," Mayer had to admit. "But—" He couldn't think of any way to end the sentence.

After a polite pause, Steiner continued: "Suppose a miracle—or rather two successive miracles—did happen. Suppose we located Zurek and caught up with him before he landed on Mars—what could we do about it?"

Mayer opened his mouth but said nothing.

"I see you understand the situation," the Colonel observed. "We couldn't force Zurek to heave-to, without threatening to blast his ship. With Miss Andersen and the captured Ganymedians aboard, Zurek would know we wouldn't dare to do that. On the other hand, he wouldn't hesitate about using his beam projectors against the Hyperion. Do you understand now how suicidal such a chase would be?"

Mayer could only nod his head sadly.

For a moment or two no one spoke, then Captain Brink said: "Do you mind if I make a suggestion, Colonel Steiner?"

"Please do."

"In view of the fact that we have just completed a successful mission, I believe we are entitled to a leave of absence. Am I right?"

"Most certainly," the Colonel agreed. "All three of you have earned vacations. How long would you like to be off duty?"

"That will be hard to predict," Brink replied. "My idea is this: Whereas it is obviously unfeasible

for us to visit Mars as representatives of the Space Navy, I see no reason why we cannot tackle this job—well, let us say—unofficially."

"Just what do you have in mind, Captain Brink?"

"What's to prevent us from organizing a free-lance expedition to attempt the rescue of Miss Andersen?" Without waiting for an answer to this question, Brink hurried on: "I would like very much to command such an expedition. From what Ensign Mayer has just said, I take it for granted that he will be willing to accompany me. How about you, Jim?"

Sullivan's bronzed countenance lighted up with joyous anticipation and he said: "You know me, Chief. Whenever there's a chance for solving a mystery and getting into a good scrap, you can always count me in."

"But what will you do for transportation?" Colonel Steiner demanded. "You must realize of course that you would not be permitted to use the Hyperion or any of the other E. R. S. N. flyers. If one of our spaceships—all of which are known to the Martians—were to land on Mars it would give them the excuse they are looking for and they would immediately declare war on the Earth."

"I realize that completely," Brink assured him. "I wasn't planning to use one of the Space Navy ships. Doubtless you already know that for over a year Lieutenant Sullivan and I have been devoting our spare time to the construction of an improved type of spaceship."

Steiner smiled and said: "I have heard something about your off-duty activities of course. As you know, I gave orders that all your requisitions for materials and labor should be honored."

"For which we have been very

grateful," Brink thanked him. "Perhaps you do not know that our new ship is now ready. It embodies several unique improvements and added features which are not found in the spaceships of standard design. We have decided to call it the 'Cosmicraft.' Jim and I are itching to try it out. Perhaps this will be a good opportunity to put it through its paces."

"Perhaps," the Colonel half agreed.

"Then you will give your consent?" Brink asked. "You will allow us to go on this free-lance expedition?"

"You realize, do you not, that this expedition as you call it will be the most dangerous mission you have ever undertaken?" Steiner hedged.

"I realize that fully," Brink told him. "And that makes me even more anxious to tackle it. Unless I am deluding myself, I have every reason to believe that Jim and Dan feel the same way about this great adventure. What is your verdict, Sir? May we go?"

"With my blessing," the Colonel acceded.

CHAPTER IV

THE INVISIBLE SPACESHIP

FOR a tense period of sleepless watchfulness—which according to their recording chronometers, corresponded to about five earth-days, the three spacefarers blasted their way through that perilous merry-go-round of cosmic junk known as "the zone of asteroids," which made the region between Jupiter and Mars a nightmare for spaceflyers.

As they neared the end of their three hundred and fifty million mile journey, the course of the Cosmicraft was regulated in such a way that the planet Mars was directly between them and the center of the sun. At

first it was just a black speck, almost imperceptible against the dazzling solar glare. Like a toy balloon being inflated, it grew with amazing rapidity until it eclipsed the sun except for the stupendous, writhing tongues of flame which made up the solar corona.

Once, as he bent over the space chart, tracing the line which indicated the path of the ship during the previous twelve hours, Ensign Mayer said: "Excuse me, Captain Brink, but it looks to me as if we have gone nearly a million miles out of our way. Couldn't we reach our destination sooner if we steered toward the location where Mars will be when we get there, rather than pointing our nose exactly at the point where it is now?"

"That's correct," Brink agreed. "We would get there a bit sooner, but not nearly so safely. You mustn't forget that, with interplanetary relations seriously strained as they are at present, the military observers of Mars will keep a constant lookout for alien spaceships. By keeping in the shadow of the planet we have a much better chance of frustrating their vigilance."

"Ah, now I understand the reason for our seemingly erratic course," Mayer responded. "But how about our rocket discharges? Aren't they more easily seen at night than in the day-time?"

"Undoubtedly," the captain admitted. "But that's a risk we cannot avoid completely. At our present distance from Mars, our exhaust flames are visible from the planet only through powerful televiviews. The only likelihood of detection is that some astronomer might just happen to point his instrument in our direction. And even if he did, he could easily mistake us for a meteor. As soon as we are

close enough to be seen by the naked eye, we shall turn off the braking rockets we are using now and rely on our gravitation nullifiers to retard our speed and set us down safely."

"But how shall we conceal ourselves after we land?" Mayer asked. "There aren't any forests or thickets on Mars are there?"

"No," Brink affirmed. "The only vegetation that can exist on Mars consists of cultivated grains and native vines which would not offer any cover for even the tiniest of flyers."

"I suppose your plan is to keep shifting the position of the Cosmicraft so it will always be on the night side of the planet," Mayer suggested.

"No," the Captain responded. "That wouldn't be at all feasible. Fortunately we don't have to worry so very much about the Cosmicraft being discovered after we land on Mars. Thanks to a very ingenious device which was invented by a spaldeen named Jimmy Sullivan, the Cosmicraft can virtually be made invisible when it is resting on the ground." Calling out to Lieutenant Sullivan, who was at the controls, Brink said: "Take a couple of bows, Jimmy."

Sullivan took his eyes off the instrument board just long enough to glance over his shoulder and say: "What do you want me to bow for?"

"The Chief has been telling me about your wonderful invention," Mayer explained.

"Which one?" Jimmy asked, "I have so many wonderful inventions to my credit."

"You shouldn't be so modest about them," Captain Brink laughed. "The one we were talking about is the invisibility device."

"Yes," said Mayer, shifting his position so that Sullivan could talk to

him without turning his head away from the control board. "Won't you tell me how your new invisibility gimmick works."

"It's really not new," Sullivan told him. "I just borrowed the idea from nature. For millions of years it has been used by animals."

"Nevertheless, I'm still interested in learning about it," Mayer grinned.

"A. Z." Sullivan rejoined. "But before I explain it to you, let me ask you a question or two."

"Proceed," Mayer agreed.

"Suppose you were to tackle the job of making something like this ship invisible, how would you try to do it?"

"There are two possible ways of accomplishing that," Mayer replied. "One of them is by making the ship absolutely transparent."

Sullivan sniffed and said: "You must have been reading that ancient yarn called 'The Invisible Man.' That was an entertaining story, but of course you realize that such a fantasy as that is absolutely impossible from a scientific point of view. You must understand that to apply any such principle as that, you would not only have to make every portion of your space ship but also everything in it, including the crew, absolutely transparent."

CAPTAIN BRINK, who had listened with an amused smile on his face, supplemented Sullivan's remarks with: "And even if you did succeed in making the ship and all its contents completely transparent, it would still be clearly visible. You must know that a glass statue, for instance is nearly as easy to distinguish as a marble one."

"True enough," Mayer conceded, "But that is because the index of re-

fraction between glass and air is about one and five-tenths. Now if the optical density of the space ship and all the things inside it were exactly the same as the optical density of air, there would be no refraction and hence our flyer would be invisible."

"That's a mighty big 'if,'" Captain Brink grinned. "But then, we've seen plenty of mighty big 'ifs' which have subsequently become realities. So, suppose we assume that your flyer and its contents have exactly the same optical density of air—And, by the way, just what air do you mean? The optical density of air on Mars is much less than that on the earth, and the atmosphere of Ganymede has a still lower index. Then again, the optical density of the atmosphere surrounding any particular planet or satellite varies considerably with the altitude. You get my point, don't you? In order to make your idea practicable you would have to devise some method of altering the optical density of your object to conform with its environment at any particular moment."

"Aw, skip it," Mayer laughed. "I didn't think so much of that idea myself. But I have another scheme for making objects invisible which perhaps is more practical."

"A. Z." said Sullivan. "Let's hear about it."

"As we all know," Mayer began. "Objects are visible to us only because of light which is reflected from their surfaces. Now if we could cover our spaceship with a special kind of paint or other coating which is absolutely black—so that it would absorb one hundred per cent of the light which fell upon it and would reflect no light whatsoever, then our flyer would become invisible."

"Now you're getting a bit warmer," Sullivan praised him. "That idea is

much more feasible than the other one, but even it has a very serious flaw."

"What is that?" Mayer asked.

"Can't you figure that out for yourself?" said the lieutenant. "If no light whatever is reflected from your ship, it will create the illusion of nothingness—sure! But that wouldn't necessarily make it invisible. On the contrary, it might make it even more conspicuous than it would be normally."

"Why so?" Dan demanded.

"Simply because it would obscure everything that happened to be in back of it. In other words, it would look like a great big hole in the landscape—a hole that would be shaped exactly like the outlines of the ship and would offer a target that a beam-gunner couldn't possibly miss."

"A. Z." Mayer grinned. "I give up. As an inventor, I seem to be a nadir. Suppose you tell me the answer."

"As I hinted a moment ago," Sullivan reminded him, "Mother Nature gave us the answer several million years ago. Did you ever hear of what zoologists call 'animal mimicry'?"

"Of course," Mayer responded. "Like the chameleon, you mean."

"The chameleon has had a lot of publicity," Sullivan rejoined. "Perhaps that age old anecdote about the chameleon who perished while trying to make good on a Scotchman's plaid kilt had something to do with its reputation for being a camouflage expert. As a matter of fact, however, there are several creatures which can give effacement lessons to the chameleon."

"For instance?" Dan prompted him.

"Well, take flatfishes, for instance, like the plaice and the sole. They have such a remarkable faculty for adjusting the color pattern of their upper surfaces to conform with the surrounding mud or sand that it is difficult to find one, even when you know

exactly where it is. The Aesop prawn, Hippolyte, has an even more remarkable ability to make itself invisible. It becomes brown on brown seaweed, green on sea lettuce, red on red seaweed and so forth. At night it turns blue, and, when daybreak arrives, it again assumes the color of the vegetation on which it rests."

"I wonder how they do it," Mayer interposed.

"Scientists discovered that a long while ago," Sullivan informed him. "The adjustment of color and pattern is due to changes in the size and shape and position of mobile pigment-cells, called chromatophores, in the skin. This must be controlled by the color of light which falls on the fish's eyes. We know this because when a flat-fish becomes blind it loses its power to change its coloring."

"Do chameleons use the same system?" Mayer inquired.

"Not exactly. Experiments have shown that the changes in coloring of chameleons depends partly on the contraction and expansion of the color cells or chromatophores in the under skin and partly on close-packed refractive granules and crystals of a waste product called guanin."

"That's interesting," said Dan. "But I don't see how you are going to coat your space ship with the skins of flat-fishes and chameleons."

Sullivan laughed and rejoined, "No but we can produce a similar effect scientifically—in fact we can actually improve on the system employed by the chameleons and prawns."

"Yes, yes, go on!" the younger man urged him.

"My system is a sort of automatic camouflage," the lieutenant continued. "The outer shell of the Cosmicraft is studded with scanning devices which are hooked up in such a manner that

they produce on the opposite side of the ship a series of overlapping images. You can look at the ship from any direction and you will see only a composite, naturally colored image of whatever happens to be directly behind it. This image fills in a faithful reproduction of that portion of the surroundings which normally would be obscured by the hull, and the craft itself becomes completely invisible."

"Now I comprehend," Mayer said. "But does it actually work?"

"Of course it works, you Goop," Sullivan snorted. "You don't suppose I'd install a device like that on the Cosmocaust without first testing it very thoroughly do you?"

"Excuse me for asking," Mayer apologized.

"Oh, that's A. Z., kid. As a matter of fact, the scheme doesn't work as well as I'd like it to," Sullivan amended this previous statement. "When you get up really close to it, the illusion is far from perfect. However, at a distance of twenty-five meters or more it functions very satisfactorily. And, since it is extremely unlikely that anyone will come any closer to us than that while we are hiding on Mars, it ought to serve—"

He was interrupted by Captain Brink, who said quietly: "Excuse me for cutting into this learned dissertation, Jimmy, but don't you think you had better get ready to land."

"A. Z., Chief," Sullivan grinned.

CHAPTER V INTO THE WEASEL'S LAIR

WITH that uncanny skill which comes only from many years of experience as a space navigator, Captain Brink set the Cosmocaust down in the Martian desert of

Menfol, about half a kilometer from the sinister fester of shacks which constituted Zurek's nest of blackguards.

After a brief conference it was decided that Sullivan, who understood the Martian language perfectly, should steal into Zurek's village and endeavor to find out what had happened to the slaves who had recently been captured in Ganymede.

As he was about to depart, Captain Brink said: "Just a minute, Jim. After you have completed your intelligence job, how are you going to find your way back to the Cosmocaust?"

"Zee!" Sullivan exclaimed. "Glad you reminded me of that! I'd have a sour time, wouldn't I, hunting all over Mars for an invisible spaceship."

"Why not use a thread?" Mayer suggested.

"A thread? I'm afraid I don't integrate with you."

"Don't you remember the yarn—"

Before he could go any further, Sullivan interrupted him with: "Yarn? I thought you said thread."

"I did, you goop. I got the idea from a yarn I read about a mythological hero who found his way out of a maze by unwinding a spool of thread."

"Now that's a sizzling idea," Sullivan sniffed. "The only trouble is that we don't happen to have any thread aboard—unless you took your sewing basket along."

"You might use wire instead of thread," Mayer persisted.

"Yes. I might if we had a few hundred meters of wire. Any amount under half a kilometer would be worthless for the purpose. I suppose your next suggestion will be that I scatter bread crumbs along the trail like Hans and Gretel did in the ancient fairy tale."

"Perhaps you have a better idea," Mayer pouted.

"Perhaps I have," the lieutenant rejoined. "We must use some sort of signal to be repeated at regular intervals."

"Surely you can't mean flashes of light or anything like that," Mayer said.

"Certainly not. Anything visible would betray our presence to the Martians. What I have in mind is a sound of some sort—something which might be heard here under normal conditions—something loud enough and distinctive enough to be recognized at a distance."

Sullivan knitted his brows for a moment or two and then exclaimed: "I have it! A jackant!"

"And what in cosmos is a jackant?" Mayer wanted to know.

"If you want that question answered, put on your thermal suit and come outside with me."

Sullivan was already attired in the electrically heated costume which earth-folk usually wore for protection against the bitter, nocturnal frigidity of the planet Mars. Responding to Sullivan's suggestion, Mayer put on his thermal suit and followed the lieutenant into the airlock.

"Is it really necessary to use the airlock?" he asked Sullivan.

"Not necessary but advisable," the older man told him. "Making our exit this way will enable us to conserve both the warmth and the pressure of the air inside the spaceship."

When the outer port was opened, Mayer felt a sudden chill which, in spite of his heated garment, made his teeth chatter. He also discovered that the atmosphere was distressingly rarefied. In order to supply his oxygen-hungry lungs with sufficient air he had to breathe furiously, like a

runner at the end of a ten kilometer race.

"Listen," he heard his companion pant.

Mayer listened. For a while he could distinguish only the sound of his own breath as it hissed in and out of his distended nostrils. Then, from a remote portion of the desert a startling cry was wafted to him. It was a weird, eerie conglomeration of chirping, howling and braying.

"What in the galaxy is that?" he asked in a labored whisper.

"A jackant," Sullivan told him.

"A what?"

"A jackant, you gink. Surely you must know what a jackant is. There's a pair of them in the International Zoological Gardens at Rome."

"Never been there," Mayer admitted. "Is it a bird, or beast or a bug?"

"Don't ask me—I'm no authority on Martian zoology. The Jackant has six legs like a bug and feathers like a bird but it suckles its young like a mammal—so take your choice."

"How big is it?"

"About the size of an Airedale dog. There goes another one—hear it?"

"Of course I hear it. Do you think I'm deaf?"

Ignoring this impertinent question, Sullivan said: "They tell me you are pretty good at impersonations. Let's hear you imitate a jackant."

Obligingly Mayer threw back his head and uttered a cry: "Chir-r-r-ak—ow-w—w-yaw-gee-yaw!"

It was so loud and penetrating that Captain Brink heard it through the insulated shell of the Cosmicraft. His face appeared at the observation port which was closest to the airlock. The expression of surprise on his countenance made Sullivan chuckle.

"Cosmilossal!" he exclaimed, giving Mayer a slap on the back which

nearly felled him. "If you had feathers and four more legs you could impersonate a jackant to perfection."

"Thanks," Mayer coughed. "But what's the idea of asking me to make a jackant of myself?"

"Can't you assimilate that? The jackant call will be our signal."

"You mean you want me to imitate a jackant to guide you back to the spaceship?"

"That's the idea precisely, my lad. Sometimes you display intelligence that is almost human. Now, be sure to get this straight, young fellow: After I've been gone about an hour or so, you are to come outside about once every ten minutes and give five or six calls like the one you just perpetrated. All I'll have to do will be to travel in the direction of the sound. Do you integrate?"

Mayer nodded and said: "I check with you. Don't worry, you can depend on me."

"A. Z., Dan, me lad. So long!"

With the enormous, springy strides which were made possible by the low gravitational attraction of Mars, Lieutenant Sullivan quickly disappeared in the darkness.

CHAPTER VI

THE WAR GOD'S CHARIOT STEEDS

WHEN Mayer reentered the spaceship, Captain Brink was making entries in the log book. Briefly the ensign told his chief about the system of signaling which he and Sullivan had agreed to use.

Brink shook his head grimly.

"What's the matter, Chief?" Mayer asked anxiously. "Anything wrong?"

"I hope not," Brink replied. "But I wish you had consulted me first."

"Does that mean we have made a

mistake—that our signals won't work?"

"That remains to be seen. And since it's too late to change the plan, there's no use in discussing it any further. Meanwhile, it looks like you have a long night's work ahead of you, so I suggest that you snatch a bit of sleep."

"I really don't feel like sleeping, Chief. This is my first night on Mars. If you don't mind, I'd like to sit up and look at the scenery. I think it's beautiful."

"Beautiful, my gravinul!" Brink snorted. "I can't see anything beautiful about the landscape of Mars. No trees. No mountains. No oceans, lakes or rivers. Nothing but bleak, arid plains and stagnant marshes overgrown with obnoxious, crawling vines."

"I wasn't thinking of the landscapes," said Mayer. "What intrigues me is the sky. Just look at it! How large and brilliant the stars are tonight."

"That's because the atmosphere is rarefied and cloudless," the captain informed him.

"Yes. And look at those two moons. How in the world did they get such outlandish names as Phobos and Deimos? Let me see. Phobos means *fear* and Deimos means *flight*. Isn't that right?"

Brink nodded.

"But why give such frightful, flighty names to a couple of lovely satellites?" Mayer wanted to know.

With an amused grin playing about his firm, thin lips, the captain said: "Apparently you know more about philology than you do about ancient mythology. For your edification permit me to inform you that Phobos and Deimos were the names of the horses

which provided the motive power for the chariot of Mars, the war god."

"Which is which?" Mayer asked.

"The one that looks about the size of a tennis ball is Phobos," Brink told him. "Deimos is the one that makes you think of a marble."

"I expected them to look bigger and brighter than that," Mayer remarked. "They are both quite close to Mars aren't they?"

To which the older man replied, "That's correct. Phobos is only 5,826 miles from the center of Mars, Deimos is 14,600 miles away—about six one hundredths of the distance between the Earth and Luna."

"They must be awfully small," was Mayer's comment.

"Deimos is about five miles in diameter. Phobos is approximately ten miles across. The apparent diameter of Deimos is about one-fifteenth that of Luna and Phobos, looks as if its diameter is about one-fourth the diameter of the earth's moon. The reason that they are relatively less brilliant than Luna is that they are nearly fifty million miles further away from the sun. The light reflected by Deimos is about 500 times as weak as that of Luna."

"Even if the chariot horses of Mars are smaller and less brilliant than our Earth-moon, I still think they are beautiful," Mayer rejoined. "You don't mind if I watch them, do you?"

"Watch them until you're looney for all I care," the Captain grumbled and went on with his work.

After a few minutes of silence, Mayer said: "Excuse me, Chief."

"Yes?" was the patient response.

"Those two moons, Deimos and Phobos, seem to be getting closer to each other."

"Naturally," Captain Brink an-

swered gruffly. "They can't very well help it."

"But—"

"Don't you understand? They are revolving around Mars in opposite directions. Phobos rises in the west and sets in the east, and it takes only eleven hours to circumnavigate the planet. Deimos rises in the east. It takes 132 hours to complete its diurnal circuit—if that means anything to you."

"Thank you Chief. But how in the universe can Phobos behave in such an erratic, backward manner. I thought every satellite had to revolve in the same direction as the rotation of the mother planet."

"Most satellites do," Brink conceded. "But there are other exceptions. Since we are stationed in Ganymede, you should know that both the eighth and ninth moons of Jupiter have retrograde motions. Phoebe, the outermost satellite of Saturn, also moves in the opposite direction from the other moons. This erratic behavior, as you call it is usually explained by the theory that the moons with retrograde motions were originally independent asteroids which wandered afar and were captured by their respective planets."

"Sounds reasonable," Mayer rejoined. "Much obliged for the lesson in astronomy."

A S Mayer continued to watch the heavenly chariot steeds he was somewhat surprised to see the round disc of Phobos shrink to a lovely, miniature crescent, while the orb of Deimos which previously had been shaped like a distorted eclipse became almost full.

He was interrupted in his observations by the half stern, half good humored voice of Captain Brink:

"Pardon me, Ensign Mayer. But if you don't mind discontinuing your moon gazing for a few minutes, I suggest that it might not be a bad idea for you to start signalling to Jimmy."

"A. Z., Chief," Mayer grinned sheepishly as he reached for his thermal suit.

Going out through the airlock, he walked to the prow of the Cosmicraft and broadcasted the agreed signal, repeating it several times. During the intervals between his imitations of the jackant's cry, he could hear them being answered by the genuine calls of these strange creatures.

Returning to the warmth of the spaceship's interior, he discovered that Captain Brink had retired to his sleeping hammock. His deep, sterorous breathing indicated that he was already slumbering soundly.

The hours which followed were far from pleasant to Daniel Mayer. Again and again he repeated the jackant's raucous yell. Again and again he tried without success to penetrate the surrounding darkness with the spaceship's televew. Again and again he listened with bated breath for the sound of approaching footsteps or for some other noise to indicate that his pal was either safe or a captive.

Finally, when a faint glow in the east gave warning of approaching false dawn, Mayer, no longer able to endure his lonely vigil, decided to awaken Captain Brink.

"What shall we do, Chief?" He said in an anxious voice. "Jimmy hasn't returned yet, and it's almost dawn."

Captain Brink rubbed his eyes, stretched himself and yawned: "Don't worry about Jimmy. He knows how to look after himself."

"But it's almost time for the sun

to rise. If he doesn't find us within the next few minutes, he is certain to be discovered."

"I was afraid something like this would happen," Captain Brink muttered. "Have you tried to locate him with the televew?"

"Yes. But it's been too dark to distinguish anything. Perhaps now—with the faint light of approaching dawn to help—"

Mayer left his sentence hanging in midair, for Captain Brink was already seated before the objective of the televew.

After ten minutes of rapid scanning and focusing, he exclaimed: "By Jupiter! I believe I see something moving. But how in Hyperion did he get away out there?"

"Where?" Mayer asked in a sepulchral whisper.

"Over there, away the other side of the slavers' village and about fifteen degrees to the north of it. Don't you see him?"

"Darned if I can," Mayer admitted.

"He just ducked behind a little sandhill. That's Jimmy all right."

"But if you can see him, isn't he liable to be discovered by the slavers?"

Brink evaded answering the question directly by saying: "There isn't much cover out there, but, such as it is, Jimmy knows how to take full advantage of it."

"Shall I go out and give the jackant call again?" Mayer asked.

"No," Captain Brink replied. "It is quite obvious that your signals have confused him instead of helping him. Get ready to take off."

Before Mayer had time to utter another word, Captain Brink turned a dial on the control board and the

gravinul began to whine. Slowly, and quietly, like a big balloon, the Cosmocraft rose in the air.

"You're not going to turn on the rockets are you, Chief?" Mayer whispered.

"Certainly not. That would give us away for certain."

"Then how—"

Somewhat impatiently Brink said: "We're going to drift. And if you want to help, please quit asking foolish questions and pray that what little breeze there is stirring will carry us in the direction we want to go."

Whether it was because of Dan's prayers or just the good luck which usually assists those who strive valiantly to help themselves, the Cosmocraft began to float in the direction of the slavers' village. It was still too dark for the unaided eyes to distinguish objects clearly, but, thanks to the amplifying effects of the televiwer, Captain Brink was able to set the craft down within a few meters of Lieutenant Sullivan's crouching form. He took care to have the hull of the spaceship between the village and the earthman.

Opening the airlock on the side of the ship which was turned away from the slavers' lair, Brink crawled stealthily out and guided Sullivan back to the Cosmocraft.

Within the protection of the invisible spaceship, Mayer embraced his pal warmly and said: "What was the trouble, Jimmy? Wasn't my imitation of the jackant's call good enough?"

"It was too darn good," Sullivan growled. "I couldn't distinguish your imitations from the genuine article. All night long, I've been chasing jackants all over the desert of Menfol!"

CHAPTER VI

THE WOK STABLES ON MARS

CAPTAIN BRINK laughed uproariously but Mayer didn't even smile. In a voice that trembled with anxiety, he asked: "Tell me, Jimmy, did you find out anything?"

"What a question to ask the greatest cosmic sleuth in the Galactic System," Captain Brink chuckled. "Of course he found out something. Where is Miss Andersen, Jimmy?"

"She's somewhere near Vanrab. Zurek sold her to the dairy farm there. She probably is being forced to herd and milk woks."

"What on Mars are woks?" Mayer wanted to know.

"You tell him, Frank," Sullivan said. "I'm afraid I'm not much good at teaching kindergarten."

Captain Brink grinned and explained, "Wok is the Martian name for a species of dairy cattle. The brutes have never been thoroughly domesticated. They are half wild and unspeakably filthy. The work of herding them and milking them is so odious and so hazardous that no free-born Martian can be hired to do it, no matter how high the wages may be. That is one reason why there is such an active market for slaves here on Mars. I understand that very few of the slaves who are forced to do this work live for more than a few months after they are drafted into the wok stables."

"How horrible!" Mayer exclaimed. Then, turning to Sullivan, he asked: "Are you sure Miss Andersen is at Vanrab?"

"Nothing is absolutely certain," Sullivan hedged. "But I'm sure enough to give you odds of ten to one if you

feel like placing a bet that she isn't there."

Ignoring the challenge, Dan demanded: "How did you find out all this?"

"Merely by keeping my ears open," Jimmy told him. "I can understand the Martian language as well as I can Terrestrial—better in fact than some of the so-called Earth-lingo that I sometimes hear masquerading as the mother-tongue. These Martian blackguards are notoriously voluble and loudmouthed. All I had to do was listen long enough and I got the whole story. As the mythological detective of yore used to say—it's elementary, my dear Watson—quite elementary."

While his two assistants were talking, Captain Brink had been preparing the Cosmicraft for flight.

"A. Z. for the take-off," he said quietly and the next instant the spaceship was in the air. A few minutes later it alighted in a marsh about half a kilometer from the wok stables at Vanrab.

"It's up to you to figure out a plan for rescuing Miss Andersen, Jimmy," Captain Brink ordered. "Take Dan with you. I'll stay here and guard the Cosmicraft. It will soon be daylight so you'll have to work fast."

"A. Z., Chief," Sullivan responded as he handed Mayer a mysterious bundle without giving him any inkling of its contents. "Come on, Dan. Let's get going."

As they entered the airlock, Captain Brink called to them: "Just a minute, boys. Haven't you forgotten something?"

"I don't think so, Chief," was Sullivan's confident reply.

"How are you going to find your way back to the Cosmicraft?" Brink asked.

"Oh, I have that all figured out,"

Sullivan told him. With a sly glance at Mayer, he added, "This time—with your kind permission—I shall depend entirely on my own resources. My method will be quite elementary. I shall blaze the trail with a radium pencil. Any objections, Chief?"

Brink countered with another question: "Are you sure that will be safe?" "Why not?"

"Suppose one of the Martians—or a party of them—sees the luminous marks and follows them to the space ship?"

"I've thought of that too. I intend to place the marks on this side of the rocks along the trail so they will be visible only from the direction of the desert. It is very unlikely that any Martians would approach from that direction."

"A. Z., Jim," Captain Brink smiled. "Good bye and good hunting!"

BY this time it was almost day-break, and the advance rays of the approaching sun were beginning to paint the dust-laden atmosphere of Mars with faint but grotesque streaks of color. Although no sign of life had yet appeared in the vicinity of the wok stables, the two space marines approaches their goal with prudent caution, taking full advantage of the scanty cover which was afforded by the rocks and sand dunes along the route.

There was no Martian sentry on guard. Since everyone—including the slaves themselves—knew positively that escape was impossible, night guards were considered superfluous. Consequently Sullivan and Mayer were able to enter the slave barracks adjacent to the stables without the slightest difficulty. Both of them were prepared to witness scenes of horror and degradation, but what they ac-

tually saw was far worse than their direst expectations. Huddled together amid unspeakable filth, like pigs in the stock pens of a space-freighter, were several hundred miserable creatures who looked and behaved and smelled more like animals than like human beings. Most of the slaves were slumbering but their pain-seared faces and cramp-twisted bodies showed clearly that even in sleep they were suffering the torments of cold, hunger and disease.

In addition to being fetidly noise-some, the place was unpleasantly noisy. From all directions came moans and hisses and snorts which were more beastly than human. One snore in particular boomed forth with such cacophonous resonance that it seemed to stand out from all the others like a tuba solo in an orchestra of bagpipes.

Grasping Mayer's wrist, Lieutenant Sullivan whispered: "Listen to that snore, Dan."

"I can hear it without listening," Mayer replied as he clapped his heavily gloved hands over his ears.

"It sounds familiar," Sullivan insisted. "I'm sure I have heard that snore somewhere before."

"And you may be equally certain that there couldn't be another like it in the universe," Mayer assured him.

"That's just what I'm athinking," Sullivan agreed as he waded through the muck and straw, trying with difficulty to avoid stepping on the human rubbish which encumbered the filthy floor. At one of the recumbant figures he kneeled, bringing his eyes close to the sleeper's face in an effort to penetrate the semi-darkness.

Looking up at Mayer, Sullivan whispered: "It's he, A. Z."

"Who is it?" Dan asked softly.

"Captain Hawkins. He's a space marine. Disappeared from Ganymede about two months ago. Suspected of deserting, but all his friends, including myself, knew better. Looks like this is a break for us as well as for him." And he shook the sleeper roughly.

No response.

Bringing his mouth close to the man's ear, Sullivan commanded: "Wake up, Al! Wake up!"

Still the captain continued to snore.

Finally Sullivan clapped his right palm over the sleeper's mouth, while with his left hand he squeezed his nostrils, thus shutting off his breath.

With a noise which resembled the gurgle of a love-sick sea-lion, Captain Hawkins awoke and sat up.

"Sh-h-h" Lieutenant Sullivan cau-tioned him. "You know me, Al. I'm Jimmy Sullivan come to save you from this vile hole."

With the sort of inflections he might have used in a fashionable drawing room, Hawkins said: "Lieutenant James Sullivan! Fawncy meet-ing you here, of all places."

Thumping him affectionately on his rag-clad back, Sullivan exclaimed: "You're the same old Al, I see. Now listen to me closely and work fast, for there isn't a second to lose. Pick out four or five Earthmen whom you know you can trust. Wake them at once and bring them over to the north-west corner of the building—the one furthest from the door. I'll tell them what to do."

When they reached the indicated corner, Sullivan told Mayer to open the package which he had been carrying. Complying with this order, Dan discovered that the bundle contained twenty needle guns. Although these weapons were scarcely larger than a

man's thumb and index finger, each of them was capable of firing a thousand shots without reloading. The tiny needle-like bullets were made of toxite, a metal which was harder than glass, tougher than steel and more poisonous than aconite. Projected by minute charges of a super-explosive called radatomite, one of these minute bullets could stop the charge of an elephant at a range of fifty meters or more.

THE five creatures that Captain Hawkins led to the corner of the barrack-room a few minutes later were a disreputable looking gang. Tattered and dirty, shivering with cold, their eyes still heavy with fatigue, they hardly looked capable of leading a revolt against the ruthlessly formidable forces of the Martain slave-drivers. But Sullivan, expert as he was in evaluating human character, was able to penetrate the superficial disguises with which their abjectness and haggardness had clothed them, and he quickly perceived that Hawkins had selected wisely and well.

Speaking softly but clearly in Espevolapuk, the language which all Earthmen understood, Lieutenant Sullivan said: "I take it for granted that if you thought you had a good chance to escape alive from this miserable hole, you would much rather run the risk of being killed in the act of fighting your way out than remain here where you are certain to die horrible deaths anyway. What do you say, fellows—am I right?"

Unanimous murmurs of assent assured him that he was.

"A. Z., Earthmen. Here's the plot. To each of you I'm going to give three of these poison needle guns. Whether you are familiar with them or not, you can easily use them. All you do

is point in the direction you want to shoot and squeeze the trigger. One of these guns is more than a match for a Martian electrolysis gun—providing of course that you shoot first.

"The time set for a revolt is sundown this evening. That will give you the advantage of escaping under the cover of darkness. Captain Hawkins will give the signal by whistling through his fingers. When you hear this whistle each of you, with as many assistants as you can recruit in the meantime, will turn on the nearest Martian guard and tie him up. Try to avoid unnecessary bloodshed, but if any one of the guards makes a move to use his gun or to signal for help, shoot him instantly.

"Between now and sundown, we depend on you to pass the word around among your fellow slaves. Each of you is to keep one of the guns yourself and give the others to two of your companions on whom you know you can rely. It is hardly necessary for me to tell you that you must be extremely cautious so that none of the guards will suspect the plot. Is that all clear?"

One of the slaves, a huge, bearded brute of a man with a horribly distended abdomen—obviously the result of an encounter with a Martian electrolysis gun—growled: "Suppose we do kill or tie up the guards, how are we going to get away from this Hell-on-Mars?"

"It will be up to you five men to figure that out," Sullivan told him. "You know more about this planet and the habits of the inhabitants than I do. I'll be absolutely frank with you and tell you that we have a spaceship hidden near here but it is a small one—only large enough for the particular ones we came here to rescue. Perhaps that sounds a bit selfish, but

you should realize that we didn't have to let you fellows in on the plot and by doing as we have, we may be jeopardizing our own safety."

"I appreciate that," the slave answered. "But if you can't help us in the getaway, perhaps you can give us a suggestion or two as to how we can help ourselves."

"Gladly," Sullivan responded. "I notice that there are several Martian airmobiles parked near the stables. It ought to be a simple matter for you fellows to commander these ships and fly to Menfol. Perhaps you already know that Zurek keeps his slaving space-craft here. If you work fast, you ought to be able to surprise Zurek and his band of blackguards. There must be someone among you who knows how to operate a space-ship. How about it?"

"I used to be a pilot for the Solar System Space-Freight Corporation," one of the men said.

"And I am a graduate space navigator," another whispered huskily.

"There you are!" Lieutenant Sullivan exclaimed. "Are there any other questions?"

The five men shook their heads and Sullivan went on, "Hail, Earthmen! Each of you take three of these guns and hide them under your garments. Remember you are the appointed leaders and the fate of all your companions depends on how well you do your parts. And now—good hunting to all of you!"

"Good hunting to you, Lieutenant!" they murmured in unison and slinked back to their sleeping places.

When they had left, Hawkins, who had of course remained behind, said, "Any special instructions for me, Jim?"

Ignoring the question, Sullivan

asked, "Do you know Ingeborg Andersen?"

"Never met the lady," Hawkins answered. "But her name sounds interesting. Who is she?"

Before Sullivan had time to answer this question, Ensign Mayer did it for him: "She's the daughter of Lars Andersen, the Christian missionary on Ganymede. Together with some native Ganymedians she was abducted about a week ago. We have reason to believe that she was brought here."

"That's quite possible," Hawkins told him. "A new bunch of slaves arrived the day before yesterday. I believe that part of them were Ganymedians. Perhaps Miss Andersen was among them. I was working in the wok pastures at the time so I couldn't be certain. Why do you ask about her in particular?"

"She's the one we came here to save," Mayer replied.

"A very special friend of Dan's," Sullivan explained.

"I see. Sorry I can't help you locate her," the captain deplored.

"Our most important job is to find Ingeborg," Mayer stated. "Do you mind if I hunt for her now, Jim?"

"A. Z," the lieutenant consented. "But you must be very careful. The work horn is liable to sound almost any minute now, and you mustn't let any of the Martian guards see you."

"I'll be careful," the ensign promised as he started the almost endless task of minutely examining the faces of the innumerable sleeping slaves.

While he was doing this, Sullivan told Hawkins about the invisible space-ship and the luminous blaze-marks which he hoped would guide them back to it.

"Try to get as close to this building as you can before you give the signal," he directed. "Dan and I will be hid-

ing inside the barrack room. Meanwhile, during the feeding and rest periods, see if you can locate Miss Andersen. She's a very beautiful blonde, with honey colored hair, blue eyes and a fair complexion."

"A very rare combination nowadays," was Albert's comment. "She ought to be easy to find."

"A. Z. When you find her, try to tell her about the impending revolt. Give her one of your needle guns and tell her to use it if necessary and to meet us at the west entrance of this building. Be there yourself of course. During the fighting and the resulting confusion it ought to be easy for us to make our way to our space ship and merrily start on our journey back to Ganymede. Do you intergrate with me?"

"I check," Hawkins wrung his comrade's hand and grinned: "Guess I'd better crawl back in my luxurious couch. Good hunting, Jimmy Boy!"

CHAPTER VII

MAYER'S RASH ATTACK

THOUGH he searched with frantic haste, Mayer was not able to inspect more than one-tenth of the sleeping slaves before the raucous note of the workhorn forced him to hurry back to the corner where Sullivan had already buried himself beneath a heap of evil smelling straw. Dan lost no time in doing likewise.

From the sounds which filtered through the bedding, the two space marines inferred that the slaves were bestirring themselves and filing out of the barrack room. They could hear the muffled shouts of the Martian slave-drivers, accompanied by the cracking of their cruel whips which, even through the thick, mud walls

of the building, sounded like rifle shots.

Presently the noise became louder, indicating that two or more of the slave-drivers had entered the barrack room. Closer and closer came their coarse laughter and ribald shouts. Though Dan did not understand a word of Martian, he sensed correctly that their conversation consisted principally of profanity and obscenity.

"What are they saying?" He whispered into the ear of Sullivan, who was lying beside him.

"They're counting the corpses." Sullivan replied softly. "Apparently they have placed bets on the number of slaves who will be dumped into the grave-canyon this morning. So far the score is seven to nothing."

Just then a whip cracked spitefully. It was followed by a pitiful scream. A woman's voice, speaking in the Earth language, began to whimper: "Please leave me alone. I'm ill, I tell you—so ill that I can't even stand on my feet. Please don't force me to work in those horrible stables today. I'd do it if I could—but I'm so weak and so sick that I just can't do it."

The only answer was another crack of the whip, followed by a vile Martian oath.

Mayer, his voice trembling with emotion, whispered, "That sounded like Ingeborg's voice." Oblivious of the risk he was taking, he sat up. Fortunately the pile of straw above him still concealed his head and the room was so dimly lighted that the movement was not noticed by the guards.

Catching one of his wrists, Sullivan cautioned: "Steady, Dan. One false move now may spoil everything."

But Mayer gave no heed to the warning.

"It is Ingeborg," he cried as he wrenched his arm free and leaped to his feet, hurling himself furiously at the two gigantic Martians.

Impelled by a sort of Berserker rage, his fists flew out with astonishing speed and force. The two Martians were completely taken by surprise and, huge as they were, both of them went down under Dan's fierce onslaught.

One of them got up again and reached for his weapon but Mayer beat him to the draw and covered him with his needle-gun. Thus, for a moment at least, he gained command of the situation. How to make use of this temporary advantage was quite another matter. As he stood there, brandishing his gun, wondering what to do next and feeling very foolish, his problem solved itself in a rather unexpected and disastrous manner. There was a swishing sound and the gun was neatly flicked out of his hand. Unperceived by Mayer, a third Martian had sneaked up behind him and, with remarkable accuracy, had struck the pistol with the end of his long whip. The lash cracked a second time and Mayer's arms were pinioned to his sides by its python-like coils.

A whistle shrilled and a few seconds later another Martian, apparently an officer, entered the barrack room. With excited words and gestures, the slave drivers explained the situation to him.

Speaking in broken Espevolapuk, the officer asked Mayer who he was and what he was doing there.

Mayer did not answer.

"How did you get here?" the Martian demanded.

No response.

"Where are your companions?"

"I have no companions," Dan lied. "I came here alone."

"Where did you come from?"

Silence was the only answer.

"So!" the officer roared. "You refuse to talk, do you? We'll see about that." Then he said something in Martian to his men. They seized Mayer and dragged him outside.

FROM his hiding place Lieutenant Sullivan had witnessed Mayer's rash attack and his subsequent arrest. It took a great deal of will power for him to restrain his natural impulse to help his pal. Fortunately for both of them, many years of active campaigning as a space marine had schooled Sullivan in the highly essential virtue of self-control. Even when he heard the Martian officer order his men to throw the Earthman into what probably was a torture chamber, he managed to hold himself in check, realizing as he did that there would be little hope of rescuing Miss Andersen if he too became a prisoner.

Although Mayer's attack on the slave drivers had seemed rashly futile, it did accomplish one thing: It diverted the Martians' attention away from Miss Andersen, and, for a while at least, made them forget to molest her.

As soon as they had left the barrack-room, Sullivan took advantage of this contingency. Worming his way cautiously across the straw-littered floor, he crawled to the place where the missionary's daughter lay moaning and weeping on her miserable bed.

"Miss Andersen!" he whispered.

She raised her head with an effort, gazing at him through eyes which burned with pain and terror.

"Don't be afraid of me," he said in a low soothing voice. "I am Lieu-

tenant Sullivan of the space marines. We have come to save you and take you back to Ganymede."

Scarcely seeming to comprehend, she moaned, "Dan! What's going to happen to him?"

Though he was as much concerned about his friend's fate as she was, Sullivan tried to reassure her by saying: "Don't worry about Dan. He can look after himself. The Martians certainly will not kill him. They know that he is more valuable to them alive than dead. He'll be kept imprisoned for only a few hours more or less. At sun-down the slaves are going to revolt, and Dan of course will be rescued." Then he briefly outlined to her the plan which he had formulated to outwit the Martian slave drivers.

Like all space marines, Sullivan was a graduate physician and he carried with him as part of his regular equipment a compact but remarkably complete medicine case and first aid kit.

Ingeborg's ailment was easy to diagnose. It was the sickness from which practically all of the wok-slaves eventually died and which for that reason was called "Slave fever."

Sullivan administered a dose of Zonine, an alkaloid which was made from the bark of a Venerian tree, followed by a powerful but non-habit-forming stimulant. Within a few minutes her fever had subsided and her strength began to flow back into her wasted limbs.

Cognizant that he could do no more for her until evening and reluctant to risk being discovered, Sullivan then crawled back to his hiding place in the corner and spent the rest of the day in the most unpleasant way a man of his type possibly could—namely in doing nothing.

CHAPTER VIII

THE REVOLT OF THE SLAVES

UNDER the able leadership of Captain Hawkins, the revolt of the wok slaves took the Martians completely by surprise. When they found themselves staring into the small but formidable barrels of the needle guns, most of the slave guards surrendered and were quickly bound and gagged. Only one of them, apparently the commanding officer, was courageous enough to put up a fight. He died with merciful speed—a dozen poisoned needles in his abdomen. Others tried to run away in the direction of the signal station, but they were slain before they had time to televise for help.

As soon as he was sure that all the guards had been disposed of, Captain Hawkins hurried to the corner of the barrack building, where he had agreed to meet Sullivan. He found the lieutenant waiting for him at the appointed rendezvous.

"Sorry, Jimmy," he panted. "I've had my eyes peeled all day without catching a single glimpse of anyone who could possibly be Miss Andersen. Looks like your expedition is a fizzle so far as rescuing her is concerned—that is, unless a miracle happens."

"The miracle has already happened," Sullivan said. Then he told Hawkins what had occurred in the barrack room that morning.

"And where is Dan now?" Albert asked.

"That's for me to find out," said Sullivan. "I'm afraid it's going to be a tough job to locate him in this maze of buildings—especially at night."

"Haven't you any idea where to look for him?"

"The only clue I have is the command which the officer gave to the

slave drivers who captured Dan."

"What did he say to them?"

"I'm not absolutely certain but I thought he told his men to throw Dan into something or another. It sounded like—but I'm sure I was mistaken."

"Spill it," Hawkins demanded.
"What did it sound like?"

To which Sullivan replied, "The Martian word for silo."

"That's all I want to know," Hawkins exclaimed.

"You mean you know where Dan is?" Sullivan asked anxiously.

"Yes. And if he's still alive we'll have him out in two shakes of a meteor's tail. It's a good thing you heard that word 'silo,'" Hawkins added. "Otherwise we probably never would have found him."

In the fast waning twilight, he led the way to a remote corner of the wok farm. With his feet he explored the filth which strewed the ground, finally locating a slab of stone. This he quickly removed, disclosing a Cimerian pit from which a musty, putrid smell emanated.

"This is what the Martians call a silo," he whispered. "It's just a huge pit dug in the ground. They use it for storing wok fodder. It's a lucky break that I had the job of emptying this silo the day before yesterday. Otherwise I shouldn't have known about it."

But Sullivan wasn't listening. He was down on his knees, yelling into that horribly ominous pit: "Hi, Dan! Are you down there, Dan?" His words came rumbling back to him like a peal of distant thunder.

With the reverberation was mingled a feeble cry which sounded as if it came from the very bowels of the planet. Sullivan couldn't understand the muffled words, but he recognized the voice of his pal.

"It's Dan, A. Z.! he rejoiced. "For God's sake, let us—"

But Captain Hawkins was already hurrying to the stables from which he promptly emerged carrying a coil of rope. A moment later they hauled Dan to safety. He was weak and haggard and he reeked to high heaven but otherwise seemed unharmed by his terrible ordeal.

By this time the Bedlam which had marked the revolt of the slaves had subsided. From the humming of the airmobile motors, the three space marines surmised that all the slaves who had survived the battle had escaped.

Quickly they returned to the barrack room, where Lieutenant Sullivan located Miss Andersen and carried her out in his muscular arms. The frigid blackness of the Martian night enveloped them; but, thanks to the luminous blaze-marks, they had no difficulty in finding their way back to the Cosmicraft.

As soon as they were all inside the ship, Captain Brink shoved off and headed for Menfol. As he approached the slavers' lair, he turned on the search beam, which drenched the ground with Q-rays. Slightly higher in frequency than ultra-violet emanations, this beam was utterly invisible to ordinary vision; but to the flyer's televue with its super-sensitive filters and screens, the scene below was brilliantly illuminated.

In the objective of this marvelous device, Captain Brink witnessed the final episode of the wok-slave's revolt. The ground was already strewn with scores of motionless bodies. Sprawled in grotesque postures, which only death could sculpture, they told an eloquent tale of the furious battle which had just taken place. Brink was gratified to observe that most of the corpses were Martians.

Only one of the slavers was still on his feet. From his massive build and his carefully braided beard, Brink easily identified him as the notorious leader, Zurek.

Armed with two of the dreaded electrolysis guns and standing with his back to the huge hull of the Krovenka space-ship, Zurew was putting up a terrific fight against hopeless odds. From his point of vantage in the air, Captain Brink saw three Terrestrials with make-shift shovels, who seemed to be burrowing beneath the space-ship's rotund belly. This mysterious activity was clarified a moment later when a man's head cautiously emerged, only a few decimeters from the unsuspecting Martian.

So clear was the image in the televi-view that Brink could easily distinguish the lemon-colored skin and lynx-like eyes of a Japanese laborer. Worming his way out of the burrow, the undersized Oriental hurled himself at the gigantic Martian. The surprise was successful, and the Jap was able to clamp an age-old Jiu Jitsu hold on Zurek's right arm, forcing him to drop one of his electrolysis guns. Instantly the weapon was snatched up by a burley negro, who fired point-blank at the Martian's expansive abdomen.

A frightful, anguished expression distorted Zurek's beastly features, and his body began to bulge and swell, like lava in the crater of an erupting volcano. Seasoned warrier as he was, Captain Brink found this sight too grawsome for even his strong stomach

to stand, so he quickly snapped off the televi-view.

"Well," he remarked, "the code of the Earth Republic Space Navy makes no provision for reprisals, and the thought of revenge is contrary to our religious principles—nevertheless there is some satisfaction in knowing that Zurek and his gang of blackguards have gotten what was coming to them—don't you think so, Al?"

The only answer was an ear-torturing snore. Curled up in one of the hammocks, Hawkins had already embarked on his favorite vocation—that of catching up on his back-sleep.

Captain Brink turned in the control seat and glanced at the other occupants of the space-ship. Sullivan was also assiduously engaged in riding his hobby. So absorbed was he in attempting to put his three dimensional puzzle together, that he obviously had not even heard the Captain's remark.

As for Miss Andersen and David Mayer, they were seated side by side at the extreme after end of the cabin. Gazing into each other's eyes with the intensely fervent ardor of young love, they had retired into an intimate, private world of their own. Never in his long and eventful life had Captain Brink seen two lovers who were so completely lost in each other.

"Oh, well," Captain Brink sighed, as he again turned his attention to the controls of his beloved space-ship: "There seems to be nothing for me to do but talk to myself. It's too bad I'm such a beastly bore."

Devolution

By EDMOND HAMILTON

Edmond Hamilton has long ranked as one of AMAZING STORIES favorite writers and in this narration an entirely original turn is given to the events as they succeed.

R OSS had ordinarily the most even of tempers, but four days of canoe travel in the wilds of North Quebec had begun to rasp it. On this, their fourth stop on the bank of the river to camp for the night, he lost control and for a few moments stood and spoke to his two companions in blistering terms.

His black eyes snapped and his darkly unshaven handsome young face worked as he spoke. The two biologists listened to him without reply at first. Gray's blond young countenance was indignant but Woodin, the older biologist, just listened impassively with his gray eyes level on Ross' angry face.

When Ross stopped for breath, Woodin's calm voice struck in. "Are you finished?"

Ross gulped as though about to resume his tirade, then abruptly got hold of himself. "Yes, I'm finished," he said sullenly.

"Then listen to me," said Woodin, like a middle-aged father admonishing a sulky child.

"You're working yourself up over nothing. Neither Gray nor I have made one complaint yet. Neither of us have once said that we disbelieve what you told us."

"You haven't said you disbelieve, no!" Ross exclaimed with anger suddenly reflaring. "But don't you suppose I can tell what you're thinking?"

"You think I told you a fairy story about the things I saw from my plane, don't you? You think I dragged you two up here on the wildest wild-goose chase, to look for incredible creatures that could never have existed. You believe that, don't you?"

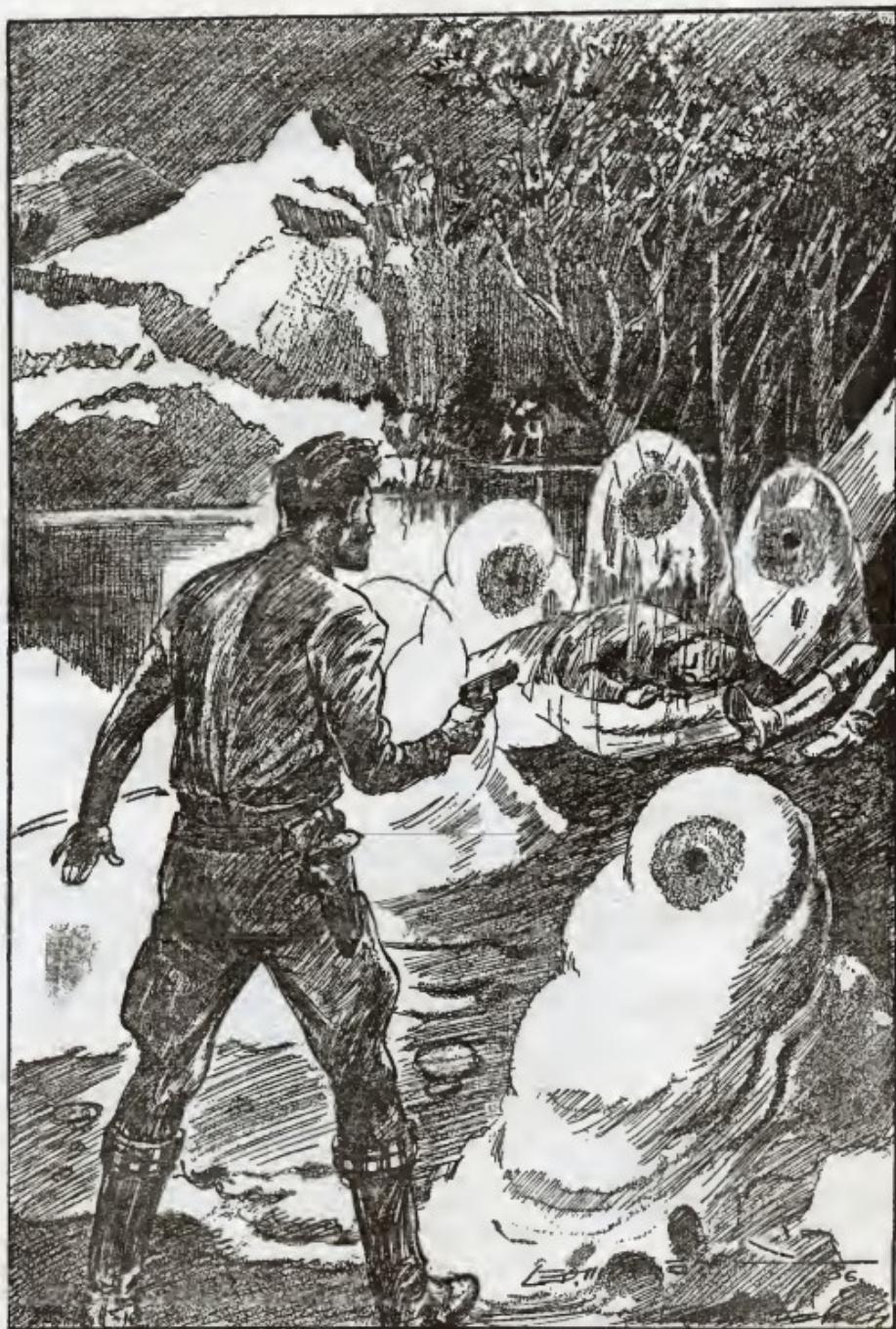
"Oh, *damn* these mosquitoes!" said Gray, slapping viciously at his neck and staring with unfriendly eyes at the aviator.

Woodin took command. "We'll go over this after we've made camp. Jim, get out the duffle-bags. Ross, will you rustle firewood?"

They both glared at him and at each other but grudgingly they obeyed. The tension eased for the time.

By the time darkness fell on the little riverside clearing, the canoe was drawn up on the bank, their trim little balloon-silk tent had been erected, and a fire crackled in front of it. Gray fed the fire with fat knots of pine while Woodin cooked over it coffee, hot cakes and the inevitable bacon.

The firelight wavered feebly up toward the tall trunks of giant hemlocks that walled the little clearing on three sides. It lit up their three khaki-clad, stained figures and the irregular white block of the tent. It gleamed out there on the ripples of the McNorton, chuckling softly as it flowed on toward the Little Whale.



He stood there in the circle of the glistening monsters, his hands and body trembling violently.

They ate silently, and as wordlessly cleaned the pans with bunches of grass. Woodin got his pipe going, the other two lit crumpled cigarettes, and then they sprawled for a time by the fire, listening to the chuckling, whispering river-sounds, the sighing sough of the higher hemlock branches, the lonesome cheeping of insects.

Woodin finally knocked his pipe out on his bootheel and sat up.

"All right," he said, "now we'll settle this argument we were having."

Ross looked a little shamefaced. "I guess I got too hot about it," he said subduedly. Then added, "But all the same, you fellows do more than half disbelieve me."

Woodin shook his head calmly. "No, we don't, Ross. When you told us that you'd seen creatures unlike anything ever heard of while flying over this wilderness, Gray and I both believed you."

"If we hadn't, do you think two busy biologists would have dropped their work to come up here with you into these unending woods and look for the things you saw?"

"I know, I know," said the aviator unsatisfactorily. "You think I saw something queer and you're taking a chance that it will be worth the trouble of coming up here after."

"But you don't believe what I've told you about the looks of the things. You think that sounds too queer to be true, don't you?"

For the first time Woodin hesitated in answering. "After all, Ross," he said indirectly, "one's eyes can play tricks when you're only glimpsing things for a moment from a plane a mile up."

"Glimpsing them?" echoed Ross. "I tell you, man, I saw them as clearly as I see you. A mile up, yes, but I had

my big binoculars with me and was using them when I saw them."

"It was near here, too, just east of the forks of the McNorton and the Little Whale. I was streaking south in a hurry for I'd been three weeks up at that government mapping survey on Hudson's Bay. I wanted to place myself by the river forks so I brought my plane down a little and used my binoculars.

"Then, down there in a clearing by the river, I saw something glisten and saw—the things. I tell you, they were incredible, but just the same I saw them clear! I forgot all about the river-forks in the moment or two I stared down at them.

"They were big, glistening things like heaps of shining jelly, so translucent that I could see the ground through them. There were at least a dozen of them and when I saw them they were gliding across that little clearing, a floating, flowing movement.

"Then they disappeared under the trees. If there'd been a clearing big enough to land in within a hundred miles I'd have landed and looked for them, but there wasn't and I had to go on. But I wanted like the devil to find out what they were and when I took the story to you two, you agreed to come up here by canoe to search for them. But I don't think now you've ever fully believed me."

WOODIN looked thoughtfully into the fire. "I think you saw something queer, all right, some queer form of life. That's why I was willing to come up on this search."

"But things such as you describe, jelly-like, translucent, gliding over the ground like that—there's been nothing like that since the first protoplasmic creatures, the beginning of

life on earth, glided over our young world ages ago."

"If there were such things then, why couldn't they have left descendants like them?" Ross argued.

Woodin shook his head. "Because they all vanished ages ago, changed into different and higher forms of life, starting the great upward climb of life that has reached its height in man.

"Those long-dead, single-celled protoplasmic creatures were the start, the crude, humble beginnings of our life. They passed away and their descendants were unlike them. We men are their descendants."

Ross looked at him, frowning. "But where did they come from in the first place, those first living things?"

Again Woodin shook his head. "That is one thing we biologists do not know and can hardly speculate upon, the origin of those first protoplasmic forms of life.

"It's been suggested that they rose spontaneously from the chemicals of earth, yet this is disproved by the fact that no such things rise spontaneously *now* from inert matter. Their origin is still a complete mystery. But, however they came into existence on earth, they were the first of life, our distant ancestors."

Woodin's eyes were dreaming, the other two forgotten, as he stared into the fire, seeing visions.

"What a glorious saga it is, that wonderful climb up from crude protoplasm creatures to man! A marvelous series of changes that has brought us from that first low form to our present splendor."

"And it might not have occurred on any other world but earth! For science is now almost sure that the cause of evolutionary mutations is the radiations of the radioactive deposits

inside the earth, acting upon the genes of all living matter."

He caught a glimpse of Ross' uncomprehending face, and despite his raptness smiled a little.

"I can see that means nothing to you. I'll try to explain. The germ-cell of every living thing on earth contains in it a certain number of small, rod-like things which are called chromosomes.

"These chromosomes are made up of strings of tiny particles which we call genes. And each of these genes has a potent and different controlling effect upon the development of the creature that grows from that germ-cell.

"Some of these genes control the creature's color, some control his size, some the shape of his limbs, and so on. Every characteristic of the creature is predetermined by the genes in its original germ-cell.

"But now and then the genes in a germ-cell will be greatly different from the genes normal to that species, and when that is so, the creature that grows from that germ-cell will be greatly different from the fellow-creatures of its species. He will be, in fact, of an entirely new species. That is the way in which new species come into existence on earth, the method of evolutionary change.

"Biologists have known this for some time and they have been searching for the cause of these sudden great changes, these mutations, as they are called. They have tried to find out what it is that affects the genes so radically.

"They have found experimentally that X-Rays and chemical rays of various kinds, when turned upon the genes of a germ-cell, will change them greatly. And the creature that grows from that germ-cell will thus be a

greatly changed creature, a mutant.

"Because of this, many biologists now believe that the radiation from the radioactive deposits inside earth, acting upon all the genes of every living thing on earth, are what cause the constant change of species, the procession of mutations, that has brought life up the evolutionary road to its present height.

"That is why I say that on any other world but earth, evolutionary progress might never have happened. For it may be that no other world has similar radioactive deposits within it to cause by gene-effect the mutations. On any other world, the first protoplasmic things that began life might have remained forever the same, down through endless generations.

"How thankful we ought to be that it was not so on earth! That mutation after mutation has followed, life ever changing and progressing into new and higher species, until the first crude protoplasm things have advanced through countless changing forms into the supreme achievement of man!"

WOODIN'S enthusiasm had carried him away as he talked but now he stopped, laughing a little as he relit his pipe.

"Sorry that I lectured you like a college freshman, Ross. But that's my chief subject of thought, my *idée fixe*, that wonderful upward climb of life through the ages."

Ross was staring thoughtfully into the fire. "It does seem wonderful the way you tell it. One species changing into another, going higher all the time—"

Gray stood up by the fire and stretched. "Well, you two can wonder over it but this crass materialist is

going to emulate his remote invertebrate ancestors and return to a prostrate position. In other words, I'm going to bed."

He looked at Ross, a doubtful grin on his blond young face, and said, "No hard feelings now, feller?"

"Forget it," the aviator grinned back. "The paddling *was* hard today and you fellows *did* look mighty skeptical."

"But you'll see! To-morrow we'll be at the forks of the Little Whale and then I'll bet we won't scout an hour before we run across those jelly-creatures."

"I hope so," said Woodin yawningly. "Then we'll see just how good your eyesight is from a mile up, and whether you've yanked two respectable scientists up here for nothing."

Later as he lay in his blankets in the little tent, listening to Gray and Ross snore and looking sleepily out at the glowing fire embers, Woodin wondered again about that.

What had Ross actually seen in that fleeting glimpse from his speeding plane? Something queer, Woodin was sure of that, so sure that he'd come on this hard trip to find it. But what exactly?

Not protoplasmic things such as he described. That couldn't be, of course. Or could it? If things like that had existed once, why couldn't they—couldn't they—

Woodin didn't know he'd been sleeping until he was wakened by Gray's cry. It wasn't a nice cry, it was the hoarse yell of someone suddenly assaulted by bone-freezing terror.

He opened his eyes at that cry to see the Incredible looming against the stars in the open door of the tent. A dark, amorphous mass humped there in the opening, glistening all over in

the starlight, and gliding into the tent. Behind it were others like it.

Things happened very quickly then. They seemed to Woodin to happen not consecutively but in a succession of swift, clicking scenes like the successive pictures of a motion picture film.

Gray's pistol roared red flame at the first viscous monster entering the tent, and the momentary flash showed the looming, glistening bulk of the thing, and Gray's panic-frozen face, and Ross clawing in his blankets for his pistol.

THEN that scene was over and instantly there was another one, Gray and Ross both stiffening suddenly as though petrified, both falling heavily over. Woodin knew they were both dead now, but didn't know how he knew it. The glistening monsters were coming on into the tent.

He ripped up the wall of the tent and plunged out into the cold starlight of the clearing. He ran three steps, he didn't know in what direction, and then he stopped. He didn't know why he stopped dead but he did.

He stood there, his brain desperately urging his limbs to fly, but his limbs would not obey. He couldn't even turn, could not move a muscle of his body. He stood, his face toward the starlit gleam of the river, stricken by a strange and utter paralysis.

Woodin heard rustling, gliding movements in the tent behind him. Now from behind, there came into the line of his vision several of the glistening things. They were gathering around him, a dozen of them it seemed, and he now could see them quite clearly.

They weren't nightmares, no. They were real as real, poised here around

him, humped, amorphous masses of viscous, translucent jelly. Each was about four feet tall and three in diameter, though their shapes kept constantly changing slightly, making dimensions hard to guess.

At the center of each translucent mass was a dark, disk-like blob or nucleus. There was nothing else to the creatures, no limbs or sense-organs. He saw that they could protrude pseudopods, though, for two, who held the bodies of Gray and Ross in such tentacles, were now bringing them out and laying them down beside Woodin.

Woodin, still quite unable to move a muscle, could see the frozen, twisted faces of the two men, and could see the pistols still gripped in their dead hands. And then as he looked on Ross' face he remembered.

The things the aviator had seen from his plane, the jelly-creatures they three had come north to search for, they were the monsters around him! But how had they killed Ross and Gray, how were they holding him petrified like this, who were they?

"We will permit you to move but you must not try to escape."

Woodin's dazed brain numbed further with wonder. Who had said those words to him? He had heard nothing, yet he had *thought* he heard.

"We will let you move but you must not attempt to escape or harm us."

He did hear those words in his mind, even though his ears heard no sound. And now his brain heard more.

"We are speaking to you by transference of thought impulses. Have you sufficient mentality to understand us?"

Minds? Minds in these things? Woodin was shaken by the thought as he stared at the glistening monsters.

His thought apparently had reached them. "Of course we have minds," came the thought answer into his brain. "We are going to let you move, now, but do not try to flee."

"I—I won't try," Woodin told himself mentally.

At once the paralysis that held him abruptly lifted. He stood there in the circle of the glistening monsters, his hands and body trembling violently.

There were ten of them, he saw now. Ten monstrous, humped masses of shining, translucent jelly, gathered around him like cowled and faceless genii come from some haunt of the unknown. One stood closer to him than the others, apparently spokesman and leader.

Woodin looked slowly around their circle, then down at his two dead companions. In the midst of the unfamiliar terrors that froze his soul, he felt a sudden aching pity as he looked down at them.

Came another strong thought into Woodin's mind from the creature closest him. "We did not wish to kill them, we came here simply to capture and communicate with the three of you.

"But when we sensed that they were trying to kill us, we slew quickly. You, who did not try to kill us but fled, we harmed not."

"What—what do you want with us, with me?" Woodin asked. He whispered it through dry lips, as well as thinking it.

There was no mental answer this time. The things stood unmoving, a silent ring of brooding, unearthly figures.

Woodin felt his mind snapping under the strain of silence and he asked the question again, screamed it.

This time the mental answer came. "I did not answer, because I was probing your mentality to ascertain whether you are of sufficient intelligence to comprehend our ideas.

"While your mind seems of an exceptionally low order, it seems possible that it can appreciate enough of what we wish to convey to understand us.

"Before beginning, however, I warn you again that it is quite impossible for you to escape or to harm any of us and that attempts to do so will result disastrously for you. It is apparent you know nothing of mental energy, so I will inform you that your two fellow-creatures were killed by the sheer power of our wills, and that your muscles were held unresponsive to your brain's commands by the same power. By our mental energy we could completely annihilate your body, if we chose."

THREE was a pause, and in that little space of silence Woodin's dazed brain clutched desperately for sanity, for steadiness.

Then came again that mental voice that seemed so like a real voice speaking in his brain.

"We are children of a galaxy whose name, as nearly as it can be approximated in your tongue, is Arctar. The galaxy of Arctar lies so many million light-years from this galaxy that it is far around the curve of the sphere of the three-dimensional cosmos.

"We came to dominance in that galaxy long ages ago. For we were creatures who could utilize our mental energy for transport, for physical power, for producing almost any effect we required. Because of this we rapidly conquered and colonized that galaxy, travelling from sun to sun without need of any vehicle.

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"Having brought all the matter of the galaxy Arctar under our control, we looked out upon the realms beyond. There are approximately a thousand million galaxies in the three-dimensional cosmos, and it seemed fitting to us that we should colonize them all so that all the matter in the cosmos should in time be brought under our control.

"Our first step was to proliferate our numbers so as to multiply our number to that required for the great task of colonization of the cosmos. This was not difficult since of course, reproduction with us is a matter of mere fission. When the requisite number of us were ready, they were divided into four forces.

"Then the whole sphere of the three-dimensional cosmos was quartered out among those four forces. Each was to colonize its division of the cosmos and so in their tremendous hosts they set out from Arctar, in four different directions.

"A part of one of these forces came to this galaxy of yours eons ago and spread out deliberately to colonize all its habitable worlds. All this took great lengths of time, of course, but our lives are of length vastly exceeding yours, and we comprehend that racial achievement is everything and individual achievement is nothing. In the colonization of this galaxy, a force of several million Arctarians came to this particular sun and, finding but this one planet of its nine nearer worlds habitable, settled here.

"Now it has been the rule that the colonists of all these worlds throughout the cosmos have kept in communication with the original home of our race, the galaxy Arctar. In that way, our people, who now hold the whole cosmos, are able to concentrate at one point all their knowledge and power,

and from that point go forth commands that shape great projects for the cosmos.

"But from this world no communications have ever been received since shortly after the force of colonizing Arctarians came here. When this was first noted the matter was deferred, it being thought that within a few more million years report would surely be made from this world too. But still no word came, until after more than a thousand million years of this silence the directing council at Arctar ordered an expedition sent to this world to ascertain the reason for such silence on the part of its colonists.

"We ten form that expedition and we started from one of the worlds of the sun you call Sirius, a short distance from your own sun, where we too are colonists. We were ordered to come with full speed to this world and ascertain why its colonists had made no report. So, wafting ourselves by mental energy through the void, we crossed the span from sun to sun and a few days ago arrived on your world.

"Imagine our perplexity when we floated down here on your world! Instead of a world peopled in every square mile by Arctarians like ourselves, descended from the original colonists, a world completely under their mental control, we find a planet that is largely a wilderness of weird forms of life!

"We remained at this spot where we had landed and for some time sent our vision forth and scanned this whole globe mentally. And our perplexity increased for never had we seen such grotesque and degraded forms of life as presented themselves to us. And not one Arctarian was to be seen on this whole planet.

"This has sorely perplexed us, for what could have done away with the

Arctarians who colonized this world? Our mighty colonists and their descendants, surely could never have been overcome and destroyed by the pitifully weak mentalities that now inhabit this globe. Yet where, when, are they?

"That is why we sought to seize you and your companions. Low as we knew your mentalities must be, it seemed that surely even such as you would know what had become of our colonists who once inhabited this world."

The thought-stream paused a moment, then raced into Woodin's mind with a clear question.

"Have you not some knowledge of what became of our colonists? Some clue as to their strange disappearance?"

The numbed biologist found himself shaking his head slowly. "I never—I never heard before of such creatures as you, such minds. They never existed on earth that we know of, and we now know almost all of the history of earth."

"Impossible!" exclaimed the thought of the Arctarian leader. "Surely you must have some knowledge of our mighty people if you know all the history of this planet."

From another Arctarian's mind came a thought, directed at the leader but impinging indirectly on Woodin's brain.

"Why not examine the past of the planet through this creature's brain and see what we can for ourselves?"

"An excellent idea!" exclaimed the leader. "His mentality will be easy enough to probe."

"What are you going to do?" cried Woodin shrilly, panic edging his voice.

The answering thoughts were calming, reassuring. "Nothing that will

harm you in the least. We are simply going to probe into your racial past by unlocking the inherited memories of your brain.

"In the unused cells of your brain lie impressed inherited racial memories that go back to your remotest ancestors. By our mental power of command we shall make those buried memories temporarily dominant and vivid in your mind.

"You will experience the same sensations, see the same scenes, that your remote ancestors of millions of years ago saw. And we, here around you, can read your mind as we now do, and so see what you are seeing, looking into the past of this planet.

"There is no danger. Physically you will remain standing here but mentally you will leap back across the ages. We shall first push your mind back to a time approximating that when our colonists came to this world, to see what happened to them."

NO sooner had this thought impinged on Woodin's mind than the starlit scene around him, the humped masses of the Arctarians, suddenly vanished and his consciousness seemed whirling through gray mist.

He knew that physically he was not moving yet mentally he had a sense of terrific velocity of motion. It was as though his mind was whirling across unthinkable gulfs, his brain expanding.

Then abruptly the gray mists cleared. A strange new scene took hazy form inside Woodin's mind.

It was a scene that he sensed, not saw. By other senses than sight did it present itself to his mind, yet it was none the less real and vivid.

He looked with those strange senses upon a strange earth, a world of gray

seas and harsh continents of rock without any speck of life upon them. The skies were heavily clouded and rain fell continually.

Down upon that world Woodin felt himself dropping, with a host of weird companions. They were each an amorphous, glistening, single-celled mass, with a dark nucelus at its center. They were Arctarians and Woodin knew that he was an Arctarian, and that he had come with the others a long way through space toward this world.

They landed in hosts upon the harsh and lifeless planet. They exerted their mentalities and by sheer telekinetic force of mental energy they altered the material world to suit them. They reared great structures and cities, cities that were not of matter but of *thought*. Weird cities built of crystallized mental energy.

Woodin could not comprehend a millionth of the activities he sensed going on in those alien Arctarian cities of thought. He realized a vast ordered mass of inquiry, investigation, experiment and communication, but all beyond his present human mind in motives and achievement. Abruptly all dissolved in gray mists again.

The mists cleared almost at once and now Woodin looked on another scene. It was later in time, this one. And now Woodin saw that time had worked strange changes upon the hosts of Arctarians, of which he still was one.

They had changed from unicellular to multicellular beings. And they were no longer all the same. Some were sessile, fixed in one spot, others mobile. Some betrayed a tendency toward the water, others toward the land. Something had changed the bodily form of the Arctarians as

generations passed, branching them out in different lines.

This strange degeneration of their bodies had been accompanied by a kindred degeneration of their minds. Woodin sensed that. In the thought-cities the ordered process of search for knowledge and power had become confused, chaotic. And the thought-cities themselves were vanishing, the Arctarians having no longer sufficient mental energy to maintain them.

The Arctarians were trying to ascertain what was causing this strange bodily and mental degeneration in them. They thought it was something that was affecting the genes of their bodies, but what it was they could not guess. On no other world had they ever degenerated so!

That scene passed rapidly into another much later. Woodin now *saw* the scene, for by then the ancestor, whose mind he looked through, had developed eyes. And he saw that the degeneration had now gone far, the Arctarians' multicellular bodies more and more stricken by the diseases of complexity and diversification.

THE last of the thought-cities now were gone. The once mighty Arctarians had become hideous, complex organisms degenerating ever further, some of them creeping and swimming in the waters, others fixed upon the land.

They still had left some of the great original mentality of their ancestors. These monstrously-degenerated creatures of land and sea, living in what Woodin's mind recognized as the late Paleozoic age, still made frantic and futile attempts to halt the terrible progress of their degradation.

Woodin's mind flashed into a scene later still, in the Mesozoic. Now the spreading degeneration had made of

the descendants of the colonists a still more horrible group of races. Great webbed and scaled and taloned creatures they were now, reptiles living in land and water.

Even these incredibly-changed creatures possessed a faint remnant of their ancestors' mental power. They made vain attempts to communicate with Arctarians far on other worlds of distant suns, to apprise them of their plight. But their minds were now too weak.

There followed a scene in the Cenozoic. The reptiles had become mammals, the downward progress of the Arctarians had gone farther. Now only the merest shreds of the original mentality remained in these degraded descendants.

And now this pitiful posterity had produced a species even more foolish and lacking in mental power than any before, ground-apes that roamed the cold plains in chattering, quarrelling packs. The last shreds of Arctarian inheritance, the ancient instincts toward dignity and cleanliness and forebearance, had faded out of these creatures.

And then a last picture filled Woodin's brain. It was the world of the present day, the world he had seen through his own eyes. But now he saw and understood it as he never had before, a world in which degeneration had gone to the utmost limit.

The apes had become even weaker bipedal creatures, who had lost almost every atom of inheritance of the old Arctarian mind. These creatures had lost, too, many of the senses which had been retained even by the apes before them.

And these creatures, these humans, were now degenerating with increas-

ing rapidity. Where at first they had killed like their animal forbears only for food, they had learned to kill wantonly. And had learned to kill each other in groups, in tribes, in nations and hemispheres. In the madness of their degeneracy they slaughtered each other until earth ran with their blood.

They were more cruel even than the apes who had preceded them, cruel with the utter cruelty of the mad. And in their progressive insanity they came to starve in the midst of plenty, to slay each other in their own cities, to cower beneath the lash of superstitious fears as no creatures had before them.

They were the last terrible descendants, the last degenerated product, of the ancient Arctarian colonists who once had been kings of intellect. Now the other animals were almost gone. These, the last hideous freaks, would soon wind up the terrible story entirely by annihilating each other in their madness.

WOODIN came suddenly to consciousness. He was standing in the starlight in the center of the riverside clearing. And around him still were poised the ten amorphous Arctarians, a silent ring.

Dazed, reeling from that tremendous and awful vision that had passed through his mind with incredible vividness, he turned slowly from one to the other of the Arctarians. Their thoughts impinged on his brain, strong, somber, shaken by terrible horror and loathing.

The sick thought of the Arctarian leader beat into Woodin's mind.

"So that is what became of our Arctarian colonists who came to this world! They degenerated, changed

into lower and lower forms of life, until these pitiful insane things, who now swarm on this world, are their last descendants.

"This world is a world of deadly horror! A world that somehow damages the genes of our race's bodies and changes them bodily and mentally, making them degenerate further each generation. Before us we see the awful result."

The shaken thought of another Arctarian asked, "But what can we do now?"

"There is nothing we can do," uttered their leader solemnly. "This degeneration, this awful change, has gone too far for us ever to reverse it now."

"Our intelligent brothers became on this poisoned world things of horror and we cannot now turn back the clock and restore them from the degraded things their descendants are."

Woodin found his voice and cried out thinly, shrilly.

"It isn't true!" he cried. "It's all a lie, what I saw! We humans aren't the product of downward devolution, we're the product of ages of upward evolution! We must be, I tell you! Why, we wouldn't want to live, I wouldn't want to live, if that other tale was true. It can't be true!"

The thought of the Arctarian leader, directed at the other amorphous shapes, reached his raving mind.

It was tinged with pity, yet strong with a superhuman loathing.

"Come, my brothers," the Arctarian was saying to his fellows. "There

is nothing we can do here on this soul-sickening world.

"Let us go, before we too are poisoned and changed. And we will send warning to Arctar that this world is a poisoned world, a world of degeneration, so that never again may any of our race come here and go down the awful road that those others went down."

"Come! We return to our own sun."

The Arctarian leader's humped shape flattened, assumed a disk-like form, then rose smoothly upward into the air.

The others too changed and followed, in a group, and a stupefied Woodin stared up at them, glistening dots lifting rapidly into the starlight.

He staggered forward a few steps, shaking his fist insanely up at the shining, receding dots.

"Come back, damn you!" he screamed. "Come back and tell me it's a lie!

"It must be a lie—it must—"

There was no sign of the vanished Arctarians now in the starlit sky. The darkness was brooding and intense around Woodin.

He screamed up again into the night but only a whispering echo answered. Wild-eyed, staggering, soul-smitten, his gaze fell on the pistol in Ross' hand. He seized it with a hoarse cry.

The stillness of the forest was broken suddenly by a sharp crack, that reverberated a moment and then died rapidly away. Then all was silent again save for the chukling whisper of the river hurrying on.

Death Creeps the Moon

By WEDE

The public has been warned about the harm which the ant-like insect, the termite, can do. It is able to wreck furniture, houses even, eating away the interior of the woodwork, but leaving the outside untouched, as a mere shell which gives to the slightest touch.

IT will be recalled by a small percentage of newspaper readers—how small a percentage I hesitate to say, since many persons hold that newspapers are written, first, to be disbelieved; and, second, to be forgotten; that in September of the past year three paleontologists, whose names were Corker, Hyde, and Spada, stumbled on a puzzling, if not inexplicable, phenomenon while probing Miocene deposits in the Rigi hills of Switzerland.

The clipping follows:

MUNSTER, Switzerland, Sept. 21 (Special to the News)—Unearthal of a perfectly preserved home built by white ants during the Early Tertiary period of life on earth, at least 1,000,000 years before the advent of man, was reported here today by Dr. A. F. Corker.

Dr. Corker, who for many years has been lecturer on paleontology at Sugarloaf College in California, declares himself unable to account for the preservation of the termitarium, or any part of it, in unfossilized form.

The self-evident absurdity of this dispatch, coming as it did from a man like Corker, whom I had been ingenuous enough to consider a conservative and trustworthy scientist, roused in me a sense of irritation for which my students suffered in their ensuing seminars; and when a second dispatch, attributed this time to Hyde and Spada, reported that the sci-

tists had cleared fifty feet of sandstone from the sides of the structure without reaching its bottom, I wired Corker, at the college's expense:

YOUR PUBLICITY-SEEKING UNTRUTHS RE MIOCENE TERMITARIUM REFLECT ON ENTIRE SUGARLOAF FACULTY STOP PLEASE RETRACT IMMEDIATELY (signed) ELWIN WHITEHEAD.

Paleontology is outside my field; indeed, rock-studies in general appeal to me as fitting amusements for children and imbeciles; but on entomology, though I say it myself, no living scholar is my equal. (I hope that Dr. Adolfus Barclay, of Pranta University, will take note, and will retract publicly his misguided, reactionary assertion that the termite, noblest of insects, should be classified as true Neuroptera. Obviously its incomplete metamorphosis makes Termitidae a sub-order of Orthoptera.)

Any schoolboy knows that these insects originated in the Miocene era, and that in all probability they will still be building nests when the last man has died of a bad liver. It is no more than they deserve. For self-sacrifice, community spirit and adaptability, give me one termite for a hundred humans any time.

There is no basis for the pretence of envious mal-contents that my fond-



*There was a closed panel in the surface of the globe, approached by a hanging ladder
The panel opened when my weight touched the ladder.*

ness for Pseudoneuroptera springs from either physical resemblance or spiritual affinity; though the contrary argument—that the insects are of the tribe Sociala, which precludes any possibility of kinship between us, since I am inclined to be misanthropic—is equally ridiculous. I need only point out the difference in size. My physical proportions are those of *homo sapiens*, overly developed as to occiput and frontal bone; and my mustache, despite the innuendoes of my enemies, bears no similarity to a white ant's antennae. There can be no kinship between a sixty-nine-year-old professor, five feet eleven inches tall (cut now to five feet eight by excessive stooping), crowning genus of the vertebrate class, Mammalia, and a Pseudoneuroptera with compound rounded eyes and an abdomen of nine distinct segments.

Corker answered my polite cablegram most insultingly. Termitarium still here stop.

Would you like to buy it query it should make you congenial home. Corker.

His tone incensed me, as it would any man with proper pride. Bearing the offensive message in my hand, I presented myself post haste at the quarters of our college president, Warburton Harrell. Brushing past the telephone attendant and entering Harrell's inner office unannounced (a procedure necessitated by the girl's ineradicable habit of saying the president is out when I know he is in, I was just in time to see his private door into the hall swing shut. I dashed in pursuit; the president, evidently in great haste, was rushing down the crowded hall with his bowler clapped askew on his head. He did not seem to hear my shouts,

though once he looked over his shoulder and almost ran down a startled coed. He has become quite deaf of recent years, and sometimes has failed to notice my loudest halloos.

HARRELL took the Administration Building steps three at a time, with me close at his heels, and leaped into his car. Fortunately it refused to start immediately, the motor being cold. I say "fortunately", because I know the president would have been much chagrined to miss me. He has said many times that my constant indictments of fellow professors show him perfectly what he has to put up with from his faculty.

"Well well, Whitehead," he said, giving over his effort to start the coupe as I deposited myself on the seat beside him, "May I—ah—drop you somewhere? Anywhere at all would be a pleasure."

"Not just now," I told him, secretly pleased at his marked graciousness; "though if ever I'm in need of transportation, I'll not hesitate to let you know."

Harrell said he was sure of that, and I showed him the cablegram.

"It is time," I stated, "that this jackanapes Corker was put in his place. Imagine pretending that a termitarium could endure unharmed from the Miocene period to the present! The college should reprimand him for sensationalism."

"Whitehead," said the persistent, "I have a better idea than that." He paused, then continued ambiguously, "Don't you think you need a rest? If it weren't that my predecessor gave you a life contract here, you'd have started resting the day I arrived. Conditions being what they are, the

trustees have—ah—decided to pay you a salary for—ah—staying away from school. Why don't you go to Switzerland yourself, and prove that Corker is a fool? Don't worry about the school," seeing that I was about to protest; "we'll miss you, but we'll get along. Yes, yes, Sugarloaf will get along."

"It's the money I was thinking of," I said. "If you could pay my expenses for the trip, as well as continuing my salary—"

"It's blackmail," murmurrd Harrell, with something akin to awe in his voice.

"What's that?" I asked.

"I was saying that the trustees will be—ah—delighted," said Harrell. "Could you leave today?"

And so, with the enthusiastic farewells of Sugarloaf ringing gratifyingly in my ears, I set out for Switzerland.

CHAPTER II

WHEREIN THE TERMITARIUM REVEALS A SECRET

IN sensitive souls such as mine, a long sea voyage is bound to produce uncomfortable reflections; especially when, as on my September crossing from New York City to Cherbourg, the water is rough. I was relieved, therefore, to see Plymouth drop behind and, later, the low coast-line of France take possession of the forward horizon. After some difficulty with the customs officers, brought on by the French people's marked degeneration in pronunciation of their language since I studied it forty-five years ago, I found myself in a second-class carriage bound for Paris, Lucerne, and Munster.

I shall not trouble you with the

details of the trip, or with chubby Corker's grudging welcome when I finally arrived. Suffice it that I had time in plenty to puzzle over the circumstance that had set down a semi-modern termitarium—for that it was such, I had no doubt—in the greenish sandstone of the Molasse; and I paused only for my afternoon nap, which none but a fool will do without, before leaving camp to examine the find.

At first glance I recognized that the nest could have been built only by Termitidae; I had seen nothing comparable to it save among the shelters of the Termite Bellicosus of South Africa. It was roughly the shape of a sugar loaf, surmounted by a broad cap, and was distinguished principally by its gigantic size. From peak to foundation it measured a full eighty-five feet.

Corker offered no comment as I entered the sloping pit his men had dug, and mounted the great hillock; but a malicious grin crossed his face (which always has reminded me of a bird's, the nose being pointed, the cheeks full, and the head set well forward on the shoulders, when I asked what progress had been made in gutting it).

"You are the entomologist," said he, winking in the infernal fashion he adopts for purposes of annoyance. "I'm only a poor student of paleontology. I am quite willing to leave further explorations to my betters."

I ignored his impertinence, but soon found the reason for it. The termitarium was impenetrable by any of the instruments at hand. Dynamite produced no crack on its milky surface; nor did nitro-glycerin, after we had transported that nasty and nerve-wracking explosive all the way from Lucerne.

"It's to be expected," chirped Corker, "that a structure which has made nothing of the erosions of the ages; which has stood unchanged while seas have become mountains and mountains seas, disregarding inconceivable pressure, ignoring fiery heat and bitter cold, shrugging aside the elements as they altered the face of earth; it's to be expected that such a structure won't be bothered by a bit of a blow-up under its bottom."

His pedantic and stilted language irritated me, who am a simple-spoken man despite my intellectual achievements; and I answered sharply, "Leave such piddling nonsense to the verse writers, Corker. This termite nest is no more of Tertiary origin than I am."

"And well you may be, from the looks of you," rejoined Corker. "As to the ant-hill, I've called in a chemist from Zurich to analyze it; for if one thing's more sure than another in this world, it's that no cellulose has gone into the cement of those walls."

With this statement I was forced to agree, though unavowedly, for I myself had found the material unexampled in my previous observations. It gave every appearance of mineral, though of a nature unfamiliar to me. My diamond ring, which I took as security the one time in my life I was foolish enough to sign a fellow professor's note, scratched its surface with the greatest difficulty.

Nor was Schmidt of Zurich, for all his big words and wisely nodding head, much better informed.

"You haff here," he said, folding his pudgy hands over his paunch as he stared up at the ant-hill, "gombound gombosed of garbon, also oggzygen, also other elemends unde-

termined. Vier Tagen we must for dermination of the gemmigal formula have."

We did not want the chemical formula, as I told him in no uncertain terms; the sum and substance of our desire was for an acid that would dissolve the walls, permitting access to the interior. This he promised to procure for us; and, somewhat to my surprise, he was as good as his word.

THE termitarium and the bodies of its last inmates varied little from what I had expected. For a reason imperceptible to me, they had sealed off their exits and entrances; but this aberration may have been caused by attacks from any one of a thousand insect tribes that failed to survive the Miocene period. Since the nest was composed entirely of excretion, my principal wonder was at their ability to digest a metal as hard as this must have been in its original state. My incredulity regarding the age of the find was wearing thin.

The termites themselves were slightly larger than those now extant, and in the antennae of mature males and females I counted as many as twenty-seven beaded joints. Their bodies partook in lesser degree of the walls' lightness and impermeability. The soldiers and workers had compound rounded eyes, indicating that, unlike modern termites, they were adults rather than modified larvae. Apart from these eccentricities, the type was one I knew by heart, from its tri-segmented thorax and nine-segmented abdomen to the four joints of its tarsi.

(An elaborate description of Termitidae and of the maze of runways composing their home has been omitted. Professor Whitehead takes

a greater interest in the square heads and mandibles of the soldiers than his readers are likely to share.—*Note.*)

Our most important discovery was made ten days later, when at the very heart of the termitarium we found a lump of cement so nearly cylindrical that it might almost have been shaped by human instruments. Applying acid to melt the cement away, we came upon a roll of paper-thin, flexible metal, scarred with perforations such as appear on the roll of a player piano. Apparently it consisted of a material that the white ants, disliking it, had sealed away.

Corker was much excited, insisting that the roll had been constructed by human hands. The assertion convicted him out of his own mouth, since humans did not exist on earth for a million years after the subtropical Miocene days; and I pointed out with some acerbity that he was contradicting himself as to the termitarium's age. Corker, though ordinarily as self-opinionated a man as you will meet in a month of Sundays, admitted the inconsistency, and suggested that the roll be offered to experts for examination. I made no objection, though I didn't like his acting as though the honor of the discovery was automatically his. After all, I was the entomologist of the party.

CHAPTER III

WHEREIN WE RECEIVE A COMMUNICATION FROM THE MOON

THE philologist and code expert with whom we consulted in Paris was a young man with a furtive glance and big ears. I fancy that he took days to stumble on the analogy between the metal

roll and the familiar player piano recordings—which I, as you will recall, had remarked immediately; Corker maintains that he first spoke of the resemblance, but he is trying to steal the credit due me, as is his habit—but in the end he appeared at our rooms with a caterwauling talking-machine. Corker and I had left further excavations to Spada and Hyde, and were staying in a rooming house on the Left Bank (*Rue Saint Jacques*) with no occupation but cribbage and arguments.

"You understand, zhentlemen," he explained, waving the crank to the phonograph as though it were an orchestra conductor's baton, "zat zese sounds bear not no relation to zose entended by ze maker of ze roll, eef he wass trying to make sounds at all."

It was difficult to understand him; he spoke English as badly as most Frenchmen speak French. Apparently, however, he was trying to tell us that whether the slots represented sounds or written words, their relationship to one another would be preserved by a properly adjusted string instrument, thus giving the effect of music, or of speech in a foreign tongue. These were transposed phonetically, replaced by their alphabetical counter-part, and pouf! there was your code.

"But you have no key," I pointed out.

"Zere, my cher Dr. Whitehead, you err," he said, his big, red ears wiggling with the effort of English speech. "Eef you regard ze page close-lee, you see zat we have brought out one picture of ze ant—"

"Termite," I corrected, examining it.

“—Or termite—which *évidemment* she ees named by ze slot *dessous*. Pictures weez correspondant slot-

names, zey are scattered everywhere. Zey bring zemselves out easily by chemicals. *La plupart* are, as we say, *inconnus*; but others, of peoples and dirigible balloons, are easily interpreted. Weez such help, I breeng you a translation soon."

Less than a week later he 'phoned to say that the English version was ready; but we refused to accept it until he'd had it examined for readability by somebody with more knowledge than he of our great mother tongue. Three days later, as we were finishing an especially tempestuous game of cribbage, he arrived with the manuscript.

"Messieurs—zhentlemen," he said, his long hands cutting planes through the air, "attend not a great deal. I think yes zat you 'ave been w'at you call 'oaxed."

He meant hoaxed. Perhaps we had been; for I noticed that he requested his pay before relinquishing the translation (a scandalous sum he charged, too; thank goodness that Corker, not I, had hired him), and left with murmured excuses immediately afterward.

I reproduce the substance of the metal roll without further preliminary.

Thirteenth Rotation, Year 12,076 of the Separation *To the Lords of Colla and to their sons, Greeting:*

Since I am but a simple-minded youth, who say what seems truth and say it clumsily, I trust that my lords will not take ill my periodic reports, of which this is the first, on the condition and attitudes of Womanland. As I am the first ambassador to the crater-capital of the western country since the wars concluding in the year 11,334 of the Separation, there are many things which are

strange to me; and I shall inform you of them in due course.

My lords will remember from the ancient history of our globe that the males and females of the human race split into distinct nations shortly after the perfection of the parthenogenesis, which occurred at the dawning of recorded history. An agreement was entered upon whereby human eggs were furnished the men, who incubated them ectogenically; and the two sexes lived for a time in peace, the males occupying the eastern and the females the western hemispheres of Luna. In that era our day occupied twenty-three rotations of Terra, our parent body. The period is now twenty-four; and Womanland astronomers estimate that within 1,000,000 years our rotation will be forced into accordance with our revolution, so that we shall present what is now the western hemisphere constantly to Terra.*

Since the less advanced men and women found difficulty in living contentedly without members of the opposite sex, raids between the two hemispheres became a commonplace, and finally led to a static state of war, which ceased a year since, when both nations discovered that they required all their energies for maintaining life in face of the swiftly lessening air supply and the unprecedented encroachment of termites and ants.

You have asked for a description of present-day women. On the whole, my lord, they bear little resemblance to our portraits and tapestries of their foremothers. In most instances superficial fatty matter has been modified or has disappeared alto-

*This has since become the case. A single rotation of the moon requires 29 d. 12 h. 44 m. 2 s. .8, or the exact length of the synodic month. It should be remembered that the sidereal month of 27 d. 7 h. 43 m. 11s.5 falls more than two earth days short of making a complete moon day.

gether. Save for a slightly enlarged cranium and the loss of the fourth toe, there has been little alteration in skeletal structure. I should explain the continuance of narrow shoulders and wide hips on the grounds that the nation is primarily sedentary.

Their daylight clothing consists of a sash of dun or other brownish color, dropping from the right shoulder to the left hip, whence it circles to drape the midriff. Between sunset and sunrise this is supplemented by a heavy slip-over, woven, as are our own, from the sinews of the rannel-frog. Luna's water-scarcity has forced the abandonment of gardening; their food now consists primarily of concentrated vitamins, flesh from domesticated beasts, and temptingly prepared underground crawlers.

With certain exceptions, Woman has acquired characteristics which once were considered typical of the Male. The cheeks have become hairy, which is especially interesting since our own have all but lost their immemorial growth. The skin of the face has abandoned its generic smoothness, and clings tightly to the bony structure. Other evolutionary progress has paralleled our own. Three toes to each foot are becoming a common-place, as opposed to the four of ancient and the five of prehistoric days. The hand is narrow, retaining four long fingers and a thumb. The teeth are non-existent in the urban population; but among the country folk, who consume more resistant foods, a set of twenty is not rare.

Surprisingly, the only definite throw-back I have observed is in the queen. It is difficult to describe her impersonally; I can say only that she resembles closely our pictures and reconstructions of ancient Woman. I

am informed that she boasts twenty-eight teeth, of which twenty-four have appeared above the gum, and that she has not only four toes to each foot, but the vestiges of a fifth. For these reasons, among others no less personal, she is not popular with the ladies of the court. To myself her appearance is enchanting; I find it pleasant to follow her about with my eyes.

I shall continue this recording on receipt of your lordships' further instructions, which I hope will arrive before the end of this Rotation. It is my sincere desire and aim that during my ministry regular communication may be resumed between our two nations, which were recently so great and which now, alas! shrink back not only from the gulf of human decadence, but from extinction itself.

Gentlemen, I sign myself with the most sincere respect and devotion:

Birna, Lord of the abandoned
White Province,
MINISTER PLENIPOTENTIARY TO
WOMANLAND.

CHAPTER IV

WHEREIN THERE IS FURTHER MENTION OF TERMITES

Fourteenth Rotation, Mid-morning.
To the Lords of Colla and to their Sons, Greeting:

I confess myself perturbed that no word from Colla has followed me since I took up residence here. Can it be that the warrior ants have overwhelmed your messenger? Or did he lose himself among the featureless termitariums that blanket the globe? Or—more horrible thought—have the insects again conquered Colla's flame walls, and swept over her one remaining city?

There are foolish conjectures, inspired wholly by my distance from you and by the difficulty of communication. If metals remained on the moon, how different the case would be! Sitting where I am, I could speak to you, as legend says our forefathers spoke, ignoring distance; or, better, I could board a carrier and be transported there in an hour's time.

I have warned the Womanland Government incessantly against the termite peril, which threatens to cut short even the few centuries of decadence that would normally remain to humans on the moon. Already these insects have appropriated over seven-eighths of the lunar surface; for Womanland has suffered hardly less than we from their invasions.

The ladies of the Court laugh at my forebodings no less than at my youth. They find my sparse beard and short, upturned nose, provocative of endless hilarity. Only the queen is sympathetic; and I think that she, too, considers me unduly pessimistic, though in her brief lifetime—she is but twenty-one years old—the non-infested area of her realm has been reduced by two-thirds. My pleadings for co-operation against the menace have fallen on barren ground, the general sentiment being that I would use the termites as bogies by which to frighten women into renewed subjection to their pre-Separation lords.

It is difficult to work under such handicaps; but progress will be as rapid as I can make it, for I am daily more deeply convinced that Colla and Womanland must join forces unequivocally and instantly if the termites are to be pushed back.

I am, Gentlemen:
Birna, etc., etc.

Seventh Rotation, 12,077

My Lords:

It relieves me to continue this message, though I cannot send it until your courier arrives. I have expected him now for half a year.

Yesterday the queen accompanied me on a taran-back canter across-country, thirty court ladies escorting us. Despite my companion's extraordinary attractiveness—she stands straight as an arrow on the back of the swift-racing web-footed fowl, her grey eyes eager and her fresh skin glowing—my mind held few pleasant reflections as we neared the border; for in the five Rotations since my arrival, the termites have forced evacuation of the one provincial Womanland city that was still inhabited. Now only Alania, the capital, with its surrounding pasture lands, remains.

When I consider that only a thousand years ago the moon provided life and comfort to 800,000,000 persons, it seems—nay, it is—incredible that today we total, males and females, less than 10,000, who decrease in number even as I write. We, who filled every arable acre of the globe with our farms and our beasts, today skulk in two craters, jealously hoarding the tiny supplies of air that linger in crevices and hollows. Through what cause the moon's gravitation could have lessened fifty percent in thirty generations none knows; but the lessening, and the consequent loss of atmospheric molecules into space, presage an early end to our race. To-day, notwithstanding Luna's lowered gravitational attraction, her atmosphere will not support even the wooden airships that our ancestors dreamed of building; water is to be found only in the deepest craters; and a man travelling taran-back, as I did

en route here, over the lunar surface, must not only wear specially constructed clothing to shield him from day's burning heat and night's icy cold, but also make constant use of an oxygen tank.

Of themselves, these circumstances would be enough to induce sombre thoughts. How much worse that the dying day of mankind should be cut short by a cumulative inundation of insects! It is unquestionable that the moon-changes which are destroying us are instilling a new vigour in them.

Queen Ala has permitted me to examine minutely the ring of flame which burns about Womanland's constricting borders. Beyond that twenty-foot band of fire the western hemisphere contains no living thing save termites and ants. What instinct has brought about the truce between them? Are they postponing resumption of their age-old warfare, until man, worse enemy of them both, shall have been destroyed? Whatever the reason, the ants' less pretentious hillocks are scattered indiscriminately among the termites' slow-swelling cones. Look where one will, there is nothing else.

When a boy, I wondered how these insects subsist after they have eaten all available food, vegetable or animal. Naturally, they do not. When the last nourishment has been extracted from their food—which, with the aid of the remarkable protozoa living in their bodies, they consume again and again, eating even their abodes in time of famine—they must move or die. Hence, I believe, their steady encroachment on human territory. No being can find the stuff of life in a spot abandoned by these crawlers. Beyond the army of insects that surround the flame-walls of Womanland there is only heaped-up sand, empty

termitariums, and grey desolation.

The women are finding in their turn that flame is no adequate protection. Though it holds off the termites for one or two Rotations, eventually they smother it, millions dying to lay a path across the blaze for their fellows.

Scientists here are seeking a poison that will end the insects. They ignore my protest that ants and termites have adapted themselves within one Rotation to every lethal preparation, flame only excepted, that Colla could find; and even the fuel for Alania's inadequate fire is growing scarce.

At any rate, they are beginning to take the problem seriously.

I am, Gentlemen:
Birna, etc., etc.

Tenth Rotation—Afternoon

My Lords:

At last Womanland has grown really frightened. The insects advanced through the outer flame so suddenly that we had barely time to light a second fire about the entrances to the buried capital itself. The co-operation between ants and termites, though dreadful in its significance, was fascinating to watch.

The queen and I were skirting the border-flame on our daily canter, when we observed that an army of syringe termites was approaching the barrier at a spot opposite us. As it arrived at the blaze, each of them ejected an eight-inch spray of viscous liquid (ordinarily a paralyzing agent, but here altered effectively to serve as a fire-extinguisher) into the flame, then marched on to be consumed. Literally millions died before they even dented the low, green flame; but neither death nor the frantic defense of our border guards stopped the remorseless march until a fire-proof rib-

bon was stretched across the barrier.

The syringe termites, their work accomplished, retreated, and we perceived a second insect army marching as though to intercept them. There was a brief colloquy among the leaders, after which the termites drew aside in serried ranks while the newcomers—true warrior ants—poured over the ribbon.

Our guards could not hold them back, even long enough to permit moving the Womanland livestock to a place of safety—if, indeed, such a place still exists. We were forced to witness the horrible spectacle of death creeping across the ground in a slow wave. Birds rose screaming from the grass as the insects invaded their nests, snuffing out the lives of the countless fledgelings and the lesser field animals that had crowded into this protected area. The livestock fled bellowing. A few were herded inside the new, hastily lighted fire, but the majority had no place of refuge. We ourselves barely escaped. What a chorus of agony rang in our retreating ears as the ants, entering through a dozen breaches at once, ate the animals alive!

Today there is nothing left of the domestic beasts but white skeletons. The circumference of the flame has shrunk to ten miles. Farmers and other country-folk have fled to the shelter of the capital, and the problem of food must be reckoned with soon.

Suicides are epidemic. Even the guards go suddenly mad, and bound through the low flames to die among the ant hills outside. Religious ecstasy has become prevalent on the streets.

The women were slow to recognize the imminence of death; but apparently they do not intend to pretend stoicism now that the imminence is avowed.

CHAPTER V

WHEREIN THE MOON IS OVERWHELMED

Eleventh Rotation; Sun on the Eastern Horizon

My Lords:

What, I wonder, were the characteristics of the civilizations that preceded ours in the moon? We have small trace of them, save for the five incomprehensible and fragmentary volumes on mechanical science which exist still in the great Colla Museum, and the immense caverns that our forebears hollowed in their insatiable search for metals. Presumably those were eras of great scientific achievement; our translations of the five volumes indicate that flights to the steaming, tremor-shaken mass of Terra were a commonplace.

Whatever the cause, metal has been a rarity since the beginning of recorded history. Where our ancestors feasted we have subsisted on scraps. For lack of ore, mechanical contraptions of all sorts have been confined to blueprints. Such metals as we possess have been reserved for the use of the medical profession, and we have carried biology alone to the triumphant fulfilment that every science deserves.

I mention this for two reasons. First, if metals were available we should be less handicapped in our losing fight against the termite horde; and second, the construction of space ships according to the formulae available might enable some of you to reach our primary, thus escaping the extinction that impends for your fellows.

I suggest that my lords gather all brass, iron, tin, etc., however infinitesimal the unit, utilizing even the

surgeon's scalpels, and construct at least one such ship. By every reckoning, earth is habitable now; if a half dozen humans land there the race may be saved.

Birna.

First Rotation 12078; Sun of the Zenith

This record must be considered henceforth as a personal journal. I can no longer delude myself; annihilation has overtaken my countrymen. So only can their long silence be explained.

Sun two degrees beyond the Zenith

Tragedy and death hang like a red sun over us all. I must fight off the stupor and lassitude, that are conquering the women who still live. Perhaps this diary will help me to retain my balance.

The ladies of the court are inclined, by what ratiocination I cannot guess, to blame the queen for all that has happened. I believe there has been considerable resentment at her graciousness toward me. My instinct likes not the whispering that ceases as one or both of us approach.

Later

Queen Ala informs me that of the five thousand souls who made up her subjects when I arrived here eight rotations ago, less than seventeen hundred are now living. Ectogenesis has been suspended; already there are too many mouths to feed. Cannibalism is rumored, but has not yet been proved.

Sun at the Horizon

I have resolved to set forth for home. If any of my fellow men still live, we may be able to carry out the space ship project—even to save a

handful of these women, though, except for the queen, I find them harsh and unprepossessing. No blueprints of the prehistoric space fliers are available here; nor is any metal on hand save that which contains the unborn infants' nutrient solutions.

Darkness

I have quitted Alania, servants with force-torches guarding me against the ants and termites. Little fuel for the fire remains, and the torches must be used sparingly.

As I write, seated on one of the empty termitariums that fill the darkness about me, I can see the lights of the palace. The remainder of the city is hidden beneath the surface of the earth. Will any of its inhabitants still live when—and if—I return?

It was difficult to leave the queen. I wished her to accompany me, but she feels that her duty lies here. She seemed distressed at our parting, though the sentiment was unreasonable. Being not only of different nations but of different sexes, we can have nothing but respect in common.

Sixth Rotation; Sun Midway to the Zenith

My food was gone before I reached Colla. At twilight of the fifth Rotation I killed and cooked my Taran, wrapping portions of the flesh in my sack and proceeding thenceforth afoot. Progress was slow among the ubiquitous termitariums, and the meat spoiled when half consumed. Whenever possible I travelled through craters, and spared my oxygen. Farmhouses that were still occupied when I went that way before are shells now, riddled by the white ants. To the eye, the buildings seemed unharmed; but a slap from my palm would transform them into heaps of grey dust.

Through all this space was no living thing; the insects themselves have moved on to the siege of Womanland.

Surmounting Colla Crater, home of my nation's capital city, I discovered at once that my worst fears were realized. The ring of flame that had flickered in the pit—man's ultimate defiance of his creeping conquerors—had gone out.

None but myself lives to name the bitterness and despair of this moment.

Sixth Rotation; Sun at the Zenith

Who can say whether it was such urgency as prompts a ghost to haunt the scenes he knew in life, or the irrepressible instinct of self-preservation, that drove me down the rim of the crater, through the still-teeming ant hills, and into the deserted, underground streets of crumbling Colla? The termites ignored me; nor did I fear bodily harm from them as long as remnants of the vegetation, that flourished here hardly more than two years ago, remained for them to digest. My eyes were peeled, however, for warrior ants, which I saw in no quantity until I was walking in the burrows of Colla proper. Here I proceeded cautiously, striving to avoid both the hurrying streams of insects and the bleached skeletons in the streets—skeletons that but yesterday were my friends. Thank God that I had no family!

Before I had advanced a hundred yards the ants' incomparable sense of smell had made them aware of a living presence. They were all around me; one, another, a dozen, a hundred, started up my legs. I beat them off, and felt their sharp jaws sink into my flesh. They filled the street like a carpet, and hung from the walls like a living tapestry. I closed my eyes and ran blindly through the

streets, slapping frantically, and realizing even as I slapped that before the sun disappeared on the surface of the world my bleached bones would be indistinguishable from those of my countrymen. The air was barren of oxygen; I had to fight for breath.

Half-blinded by bites, I crashed into an unfamiliar object, and fell prone. In an instant I was up again, peering through protecting fingers at the immense globe I had run against. It stood in the courtyard, which, with the reigning prince's castle, is the only part of modern lunar cities exposed to the outside world. There was a closed panel in the surface of the globe, approached by a hanging ladder up which I swarmed like one of Luna's long-extinct four-handed mammals. The panel shot open when my weight touched the ladder, and closed behind me as I dived inside.

My first thought was to rip away my clothing and crush the life from the insects tearing at my flesh. I was swollen to a quarter again my normal size; one of my eyes was shut; my entire body burned like a campfire.

Quite five minutes passed before I realized that I was inside a spherical space ship, constructed by the Collans in a last, despairing attempt to flee the termites and ants. The stratagem recommended by me in a never-dispatched letter had been invoked spontaneously.

CHAPTER VI

WHEREIN THE LAST HUMANS LEAVE LUNA FOR THE EARTH

Sun at the Horizon

FROM the scaffoldings scattered on the ground outside, it appears that a second flier was built. Is it even now boring through space toward Terra? Why is this one still

here? I can imagine only that the crew misjudged the time left them, and were either suffocated or eaten alive before they could reach the ship.

The word "suffocation" reminds me that I have discovered why so little oxygen remains in the air of this city. It is stored here in liquid form, to be used as power.

All the metal on the eastern hemisphere must have been required for the building of these two globes. What a stupendous task for a decadent race, that not only had to create from half-comprehended sketches the very tools with which they worked, but to incorporate the tools, once used, into the body of the ship to prevent wastage!

The alloy is unfamiliar to me, though I dare say it is principally carbon. Its extreme hardness leads to the supposition that in some fashion the meteorite which lay so many thousands of years in the Colla museum has been used. At least two elements in it do not exist on the moon.

The flier is well stocked with provisions. It would hold thirty men easily, yet it is maneuverable by one. Rocket blasts can be released from any point on its pitted surface.

Eighth Rotation: Twilight

"Twilight" is an outmoded word on the moon. Not enough air remains outside the deeper craters to prolong the last agonies of day; night falls pitchy black as soon as the sun disappears. This evening, however, Terra is gibbous, and reflects a light strong enough to see by.

Mingled with my desolation at the extinction of mankind—for I determined that no human life remains on Colla by cruising the eastern hemis-

phere before the sun set—are other emotions. Among them is a renewed awe at the bulk of earth. I have seen it hanging overhead a thousand times; but never till now have I given its opalescent surface more than a fleeting thought. What monstrous, inconceivable life forms exist beyond that shifting cloud-envelope? Will they be essentially similar to those the moon knew in some long-past period of her development, as scientists have long insisted? Or is life there developing in a manner which has no lunar parallel?

As I write these words, the ship is plunging with set controls to the west. I am returning at full speed to Womanland, hoping against hope that here, at least, human life may remain. My thoughts return irresistibly to Queen Ala, whose hand was so warm in mine as I bade her farewell.

Even if the women are dead, there is some hope that their nutrient solution and the unborn children immersed in it may remain undisturbed. It has been my observation that termites require some time to adjust their secretions for digestion or destruction of unfamiliar metals.

In Space

If only I knew something of planetary laws and motions! My space-traveling is sheer guess-work; I am headed for a spot in the heavens that may, or may not, intersect the orbit of young, steaming Terra. How fast is the ship moving? I have no idea. Undoubtedly it will arrive eventually—as a man-controlled globe if fuel and food hold out; as a blazing meteorite if they do not.

Before arriving at Alania I saw, sprawled among the termitariums, the clean-picked skeletons of a human

procession; every indication was that the remaining women, attempting to break through the circle of insect death, had been overwhelmed and destroyed.

I continued to the capital with a heart even heavier than it had been before. The thought of the queens was with me constantly; and the knowledge that I was surrounded by a stillness that could never be broken save by my own voice acted as the advance-agent of madness. The shock of renewed hope when I discovered that the city was still surrounded by a fading ring of fire, though in a dozen places termite trails crossed the flames, very nearly completed the work on my mind that despair had started. Yet I was unable to perceive any signs of life save for the tide-like shifting of ants in the castle yard and about the entrances to the underground passages.

The sudden appearance of a woman on the topmost turret wall arrested me as I was about to sail off. She stared fixedly at my hovering vessel, with the blankness of one who believes she is seeing visions. I could see her ragged clothing and sunken cheeks.

A moment later I had dropped the swaying ladder, descended, and carried her perilously to safety.

Queen Ala's tense gaze relaxed; she sobbed in my arms, broken by relief.

"My women deserted me," she said at last, "locking me in the tower with my maid. It was after the seventh sleep of the seventh Rotation that they went. The food they left lasted, by rationing, until three sleeps ago. The termites broke through the inner wall of flame on the same day that the last of the provisions went; but the tower is of crackless stone, and they could not reach me."

"Where is the maid?" I asked.

"At my last awakening she lay beside me, dead of starvation."

The nightmare continues; but somehow I can no longer despair. Ala smiled a moment since, for the first time; and I think that a measure of happiness may be awaiting us on Terra.

Approaching Earth

We shall be in terrestrial atmosphere after the next sleep. Ala and I are taking turns at peering through the great, circular windows that line our ship. Never was so courageous, so uncomplaining a woman—or man, for that matter—as Ala!

Providence has left us food and fuel to spare. We shall have the fundamentals of life, to last us until we learn what earthly conditions we face.

What fate, I wonder, is in store for us beneath those milky, opaque clouds, lighted now by the rays of a termite-ruled moon?

Hovering Above the Surface

I, who write this, am a dead man; in minutes the skin will be torn from my flesh, and the flesh from my bones.

Last night we first realized that insects might be secreted within our walls. Fool that I was! Should I not have apprehended that in the long Rotations of this ship's presence in the Collan courtyard, the termites would learn the secret of its tough metal?

Why did they wait until we had all but reached our destination before revealing themselves? Did they wish to utilize my superior astronomical knowledge in space? That is madness; but I am near madness.

This morning Ala did not rouse at her usual hour. When I went, unsuspecting, to awaken her, I saw such a

spectacle as no man who loves a woman may see and live. Even the sheet, that might else have hidden the poor skeleton, was eaten away.

Termites and warrier ants are entering from the provision room now in two long, steady streams. It is time to cut off the rocket blast, and let the vessel fall ten thousand feet to earth.

If the other spaceship arrived safely, these words may some day be read. Farewell.

BIRNA.

EPILOGUE

"Twaddle!" said I, tossing away the last sheet.

"Yes—twaddle," agreed Corker doubtfully.

THE END

Science Questionnaire

1. Give some examples of omens of ancient days. (See Page 15)
2. Why would information from the stars come too late to do us any good? (See Page 15)
3. Can any astronomical relations be traced between the motion of stars and planets and future events on our earth? (See Page 16)
4. In past ages astronomy and astrology moved side by side. Is it on record that many distinguished men believed in both? (See Page 16)
5. Does astrology suggest that there is no need of making any provision for the future? (See Page 16)
6. Has agnosticism ever been described as an intellectual disease and that some faith, even in some absurdity, is better than no faith at all? (See Page 17)
7. What distinction can be drawn from the work of the Weather Bureau and the alleged work of astrologers? (See Page 18)
8. Name some of the principal satellites of Jupiter. (See Page 22)
9. Describe a theoretical connection between metal fatigue and intracrystal vibrations. (See Pages 23-24)
10. Sound is due to the vibration of matter. To what is light attributed? (See Page 31)
11. How could you convert monochromatic light so as to produce annihilation of energy? (See Page 33)
12. What would be the effect of high peripheral velocity in a rotating body? (See Page 53)
13. Give a suggestion for a substitute for the present telescope. (See Page 64)
14. How might an electrolysis beam operate on the human body? (See Page 66)
15. Describe chromosomes and genes and the operation of the genes. (See Page 93)
16. What problem in the development of life, is considered unsolvable? (See Page 93)
17. What peculiar theory is held by some biologists about the connection between radioactive deposits in the earth and genes? (See Page 94)

When The Earth Stood Still

By ARLYN H. VANCE

This is an impressive story based on the cosmic ray. It illustrates the danger of man's interference with nature. Perhaps this interference has already begun in a small way.

SCANT four hundred miles north of Chicago, near the center of that wild, densely wooded section of Wisconsin sometimes called the "last frontier," lies the blue-green waters of Turtle Lake. Viewed on a map, or better, from the air, it resembles a giant turtle with head and legs extended—hence the name. More than five miles long, and proportionately wide, its vast expanse is a paradise for visiting fishermen, while many miles of tree lined shores provide a cool summer haven for the harassed city dwellers who annually seek the pleasant vistas of the northern forests.

Perhaps half a mile off-shore, east from the center of the western edge of the lake lies the little island of Crawling Stone, a mere dot in this large body of water. It was the pleasant summer home of Dr. Frank Howell, B. Sc., M.I.E.E., and one time Professor of Science at a leading University. The house could be dimly seen standing on the peak of a low hill in the center of the island, half hidden by the fringe of evergreen trees which lined the rocky shore. High above the tree tops a single aerial mast, glistening with newness and supporting

a type of vertical aerial utterly strange to the modern conception of radio, added an aspect of wizardry to this seemingly enchanted island.

Indeed, the dim mysteries of a past which had long since faded into eternity did seem to cast a queer spell over the place, for an ancient Indian legend told a weird tale of Pagan priests, human sacrifices, and a curse put upon the spot countless centuries before the white men came. Because it had been the scene of these unspeakable barbaric rites, the ground and rocks now forming the island had been torn loose from the mainland and sent to wander around the lake until the day of doom. Then cleansed of sin, it would return again to its former place as a part of the eastern shore of the lake.

Occasionally, on summer nights in the dark of the moon, the waters of the lake seemed to moan dismally as they washed the foot of the rocky promontory forming the east side of the island. And in winter, when heavy ice quieted the crying lake, and deep snows spread a mantle of silence over the landscape, still stranger things were reported to happen in this land



Plastered against the ceiling and facing downward, Alan forced a wry grin, although the shock had nearly knocked him out.

of frost-bound desolation. The few white natives who lived on the mainland through the long northern winter, told strange tales of ghostly figures flitting by night about the island. They told unbelievable stories of an unearthly golden glow which illuminated the tree tops when even the stars grew cold and froze in the heavens. And in winter none among them were brave enough to visit the island either by night or by day.

Sometimes during the warm summer days, when the sun shone brightly, banishing all fear, Chief Eagle Eye, the oracle of the Chippewas and the oldest living member of his tribe, would tell the ancient legend to a group of listeners. Surrounded by a colorful party of summer visitors, and standing proudly erect in the calm dignity befitting an Indian leader, he would tell the story in the language of his race. Though there were few who understood his words, his serious pose and dramatic gestures never failed to send shivers of apprehension through his listeners.

"Many, many moons ago," he told them, "so long ago that my people have lost all count of time, a small band of my ancestors came here to live. They found much game and many fish. The signs told them others had been here before, but had even then been gone for many moons.

"No island stood in the lake, and enemies threatened my people. One night, when Takwan, the Great Warrior, stood guard, a Giant came down out of the clouds, and spoke to him-with-the-truthful-tongue: 'I am King of the world, and come as a friend of your people. That you shall not doubt my words, O, leader of the Chippewas, I shall make for you a refuge from your enemies, even from the wild beasts of the forests!'

"Before the eyes of Takwan, a piece of land broke away from the eastern shore and moved slowly out in the lake. 'It shall be an accursed spot to many, but to your people it shall be there to protect you from your enemies. It shall be doomed to float in the waters of the lake until the end of time.'

"Then the Giant spoke again in a voice of thunder, but the others did not awaken: 'Your people shall grow great and strong, and for many moons shall rule the land. Palefaces shall come and the Chippewas shall grow few, even until the end. And one day a paleface shall live on the Island of Crawling Stone, which will mark the beginning of the end. For this white one shall live in a place of madness, and shall seem as one demented. Even then the end shall be in sight, and the Sun, and the Moon, and the Stars, shall grow dim, and time will be no more!'

"A long night shall come, lasting for many moons. And many, even almost to the last one, shall close his eyes in the last long sleep. The spirits of a few shall depart to the land of the deer and the rabbit, the happy hunting ground from which there will be no return. Then, but not until then, shall the Crawling Stone be cleansed of sin, to return again to its place as a part of the land where men may tread without fear.'

"A Great Light of Gold appeared in the heavens, and the giant was lifted up and away. Takwan—him-with-the-truthful-tongue—awakened his people to tell them of his vision. And they saw the Island of the Crawling Stone, where they stayed hidden many, many times from their enemies;" the old Chief turned and stalked majestically away, perhaps to brood in silence over the fate of worlds.

DR. HOWELL had found the story amusing, and yet, garbled as it may have been by being handed down through the centuries by word of mouth, at times it seemed even to his intensely practical mind to hold some sinister threat for the future of the world he loved. But the realms of fantasy were not for him, and he dared not allow an unproved Indian legend to influence his scientific thought. Yet he had, only within the past year, gone so far as to suggest and even attempt to prove, that science would ultimately defeat its own ends by destroying itself.

Only recently science had made such strides that things undreamed of but a decade before were now accomplished facts. And there was no logical end in sight. Totally uncontrolled by any natural agency except time, the scientists of the world had entered an era of mad accomplishment, striving for the "Supremacy of Science" at any cost. And Dr. Howell, by his act of publicly calling attention to certain fundamental facts, had brought down upon his head the wrath of the entire scientific world—to his own undoing. He was now discredited while all his previous brilliant accomplishments had been forgotten.

With a feeling of helpless futility he sought the seclusion of his summer home on the Crawling Stone, where, hidden from a ridiculing world, he could seek the answer to the strange problems of Creation. The world of science had called him a madman, and sent him away to the strange laboratory he had constructed in this out of the way place. Indeed, a modern scientist would have called it a "negative" laboratory, designed to destroy the positive accomplishments of science if a need arose. And Dr. Howell did believe that the ravages of science would

some day make such a course necessary.

Yet his retirement to the island had brought a strange blight upon the island and to the members of his household. Once the favored spot for many of the social activities of the fashionable summer colony, it was now shunned as a plague. One short space of time between summer seasons had brought this about, and the world would have none of him.

Although largely lacking in what the world calls wealth, Dr. Howell's wife, Eleanor Howell, and their daughter Mary, had on previous summers taken an active part in the social life of the north woods. But now they were barred from this pleasurable summer game, apparently by a capricious rumor, or rumors, which had gone the rounds of this select group.

Yet the seclusion of the four members of Dr. Howell's household,—he had included another at the beginning of the season,—was purely social. No signs banned the uninvited guest, and no bars restrained the island inhabitants on their bit of land.

THOUGH the lake was dotted with water craft, none stopped at the island landing. No fisherman cast his lure toward its rocky shore, and all seemed intent on giving the Crawling Stone as wide a berth as possible. Indeed, any attempt of either side toward the resumption of friendly intercourse would have been futile, for the sinister rumor persisted—Dr. Howell had gone completely mad.

Perhaps the addition of Alan Winters to the Doctor's family had something to do with the rumor, for current gossip, ever seeking to dramatize the commonest incident, offered more than one reason for his presence. One

of these linked his name to that of pretty Mary Howell, while the other intimated that he was a young interne who had been hired by the family as a keeper for the learned scientist. And the local socialites failed completely to accept the real reason for Alan's presence. In this failure lay a deadly menace to the future safety of humanity.

True, there were those who reported having seen Dr. Howell at close range on his infrequent visits to the mainland, always in the company of Alan Winters. They told a weird tale of seeing a strange glitter in the eyes of the scientist, suggesting that this was a sure indication of criminal insanity. And remembering the Indian Legend the story had gained momentum with each passing day. Could it really be that the first part of the Indian Prophecy had been fulfilled—that a white man would live on the Crawling Stone, and that it would be as a place of madness?

But the blasé summer crowd, living in the thrilling, fast moving reality of the present cared not at all for another whose mind may have succumbed to a monomania of scientific thought. For in the serious contemplation of the infinite lies the road to madness. The crowd knew not, and perhaps cared even less, that this man with the warped mind was even then trying to save the world from utter, absolute destruction at its own hands. It may be that the world did not wish to be saved.

With a single week of the season yet remaining, the pleasure seeking summer colony redoubled its efforts to drain to the last drop the cup of pleasure, for Labor Day would mean the return to school and work. A few took time out to tap their heads significantly, as they looked toward the Island of the Crawling Stone, and to laugh

at the thought of the lone scientist who labored there in a frenzy of madness, seeking to prove the coming destruction of the world. Why, the man *must* be daffy to stand alone against the entire scientific world!

Yes, Labor Day would be a red letter day in Science, for on that day impressive ceremonies would mark the official starting of the giant Cosmic Ray absorption generators of General Power Co. The President of the United States would press a button, and the radio would carry a story of the scene and the hum of the huge generators to a waiting world, which waited impatiently for this newly promised emancipation from decades of drudgery.

A dream of centuries was about to be realized, and scientific men labored for its accomplishment in a furor of excitement. Power! And yet more Power! Power for industry,—cheap and unlimited! Power to lessen the hours of labor! Science had achieved the unachievable, and one mad scientist could not change the course of the world! It was unthinkable,—and amusing!

Evening,—and for the first time in weeks Alan Winters had an opportunity to view his summer's work in perspective. The days, and even the nights, had sped swiftly, for the work in Dr. Howell's laboratory had gone on and on, seemingly without end. Together they had labored over strange machines, testing and measuring, ever seeking an answer to show the probable effects of the Cosmic Rays on the laws of the universe.

LACKING the resources of the huge corporation laboratories of the General Power Co. Dr. Howell had struggled on with pitifully inadequate equipment toward a solution he alone

seemed to understand. He had pursued his goal with a tireless energy, often working long hours after the younger man had been forced to quit through sheer fatigue. Indeed, there were times when even Alan doubted the scientist's sanity, so ruthlessly had he driven toward the solution of this problem of the Creation.

"Alan?" a voice interrupted his somewhat morbid thoughts, "I thought I would find you here."

"Hello, Mary," Winters spoke quietly, "I'm glad you came."

The sun sank slowly below the western horizon, casting a spot of red rippling over the waters of the lake.

"The Doctor has finished his work, and I am just contemplating the wonders of the Infinite," continued Alan, "It is all beyond my understanding—."

"Alan! Please,—"

"Why? what is it, Mary?"

"Please don't talk about it, Alan. That's the road to madness,—poor Father," her voice ended in a half sob.

"Mary!—You mean?"

"Yes, Alan. Mother and I talked it over today. I am sure Dad's mind is affected. People have been talking all summer about him, but we didn't realize it. He has taken his work so seriously—thinking of nothing else."

"And now he is so sure that he has worked out an answer the leading scientists will accept. To-morrow, he will go to Chicago, and submit his figures to the council. But, Alan, if they don't accept them, I fear—Oh, Alan, I'm terribly afraid."

"I must confess, Mary," Alan told her, "sometimes, even I have doubted his complete sanity. Perhaps he is right in his hypothesis,—that I cannot say, his figures are beyond me. But even if he is right, he has worked too

hard, and too long. I didn't want to tell you before, but now—."

"He appreciates your loyalty, Alan. I am sure he does, and we all do. But there is only a week left until the generator goes into operation. After that, —well, if he is wrong, we will take a long rest, somewhere in the south—."

"Surely, he isn't going down there alone?" asked Alan.

"Yes,—he insists. We can only stay here and wait,—and hope—" her voice trailed off into silence.

Alan's thoughts traveled back to the University, to his last days there, and to the dramatic scene in Dr. Howell's office:

Hurrying through the corridor of Science Hall with the last batch of the spring semester's final examination papers under his arm, Alan had paused the barest fraction of a second to listen before opening the door of Dr. Howell's office. Although custom at the University decreed that he use the Doctor's office for the clerical work which fell to his lot, he had made it a point not to enter unannounced if sounds within indicated that others were present. But a dead silence greeted him, seeming to offer an undisturbed hour for grading and classifying a new crop of victims of an educational system, in which he played a minor part as an assistant instructor.

"Thank Heaven," he thought, "just two more days of this dreary routine, with its petty politics, its wire-pulling, and its professional jealousies; then my first visit to the north woods with Mary—," the door opened noiselessly, and he paused on the threshold in amazement—the room was occupied.

Dr. Howell, his immediate superior, sat at his desk with head bowed on his hands. He looked up quickly at Alan's entrance. Across the desk, fac-

ing him, sat Dr. L. Dawson Furner, Dean of the Department of Science, and chief of the teaching staff. Winters mumbled an apology and turned to leave, but was stopped by Dr. Howell.

"Come in, Alan," he said, with what might easily have been a note of relief in his voice, "the Dean and I were just discussing a matter with which you are familiar. You will not be intruding."

"But, Dr. Howell—," the Dean seemed to resent the interruption, "perhaps you will not care to have Mr. Winters present during the conclusion of our discussion." His words carried a threat.

"Oh, that will be all right," Dr. Howell replied, easily. "But we need not be disturbed by Mr. Winters' presence. He usually does his work here and I think he has something to do which must be completed to-day."

Dean Furner admitted the checkmate with a grudging word of assent, and Winters turned to his desk, where he tried vainly to concentrate on the work in hand. But he could not shut out a thought of the consequences this unexpected and surprising visit might bring, for local tradition had it that the arrogant Dean never visited the office of a subordinate unless the one visited was "on the spot."

THE silence which had greeted Winters' entrance was decidedly not the kind which often falls between friends who are in perfect accord. Rather, it spoke of professional jealousies and personal hatreds. It was the kind of silence which sometimes forms a barrier between enemies, serving but one good purpose;—to keep them from destroying each other.

In fact, for more than a year stories of the personal enmity of Dean Furner toward Dr. Howell had been a favorite subject for gossip at the university. The "underground" carried almost daily some new story of his antagonism, and even among the hired help bets had been placed on just how long Dr. Howell would be permitted to remain a member of the Faculty.

Probably suppressed beneath a veneer of diplomatic hypocrisy since the advent of Professor Howell some years before, Dean Furner's antagonism toward his subordinate had apparently become active, when Dr. Howell had published his new theory of the Universe. It was controversial matter of profound interest to students of higher science, and numbers of advanced students had taken sides in the controversy. Some went so far as to say that the fate of the world might eventually rest on the correct settlement of the question.

"Your case came up before the Board of Trustees yesterday," Furner broke a silence which had become oppressive, "and, of course, they had to make a decision. You understand, Dr. Howell, that I could hardly oppose the Board in the matter."

"I would not expect it," Howell stated, in a matter-of-fact tone.

"They all felt as I do, that you should take an indeterminate leave of absence,—for rest and mental relaxation," the Dean added, significantly.

"Your regular duties have been hard, and the addition of extra scientific research has impaired your efficiency to such an extent that your services are no longer of value to the University," Dean Furner concluded coldly.

"Of course I was not aware that my mental condition was bad, but I

suppose one who is the victim of some disease of the mind is seldom aware of it," Dr. Howell said, bitterly. "However, since the board insists that I need a rest, then naturally I must take a rest,—without pay, I suppose."

"No, although your contract expires this spring, the Board insist that you accept one half year's salary. That will give you an opportunity to seek another position without too great loss."

Although the snobbish Dean, together with his satellites on the Faculty had condescended to accept Dr. Howell when he came from a small western school three years previously, actual hostilities had not begun until his published theory had directed the spotlight toward him and his work. The facts as set forth met with a bitter attack by a few leading scientists, and Dr. Howell's fellow members on the Faculty turned against him without a single exception. It was a heart-breaking result for the years he had given to scientific thought.

But the acceptance or rejection of Dr. Howell's theory of planetary inter-relationship as balanced by the Cosmic Ray had a more sinister aspect than a mere division of human personalities. If his figures were correct, then the harnessing of Cosmic Energy would be a very grave mistake, even granting that it was practicable. For his calculations showed beyond the shadow of a doubt that any one of several kinds of cataclysm would be the natural result of this misdirected scientific achievement.

Dr. Howell had dared to suggest that scientific progress in this direction be halted, temporarily, at least, so that further investigation could be made of the Cosmic Ray phenomena. He had asked that this be done as a

means of promoting human welfare,—that the human race might continue to live and inhabit the earth.

ALTHOUGH he had gone to great lengths to prove the correctness of his formulas, using every known mathematical means, his theory had been bandied about the scientific world as the prize joke of the twentieth century. It was rather broadly hinted in certain quarters that Dr. Howell's mind had strayed too far into the Infinite, and that his calculations were based on a hypothesis which was wholly erroneous. The few who did accept his work were the "unknowns" of science; without influence they could only watch and wait.

"Of course I am well aware of the real reason for this act of scientific vandalism by the Board," Dr. Howell's tone was ironical, "—for that is exactly what it must be. They feel that the refusal of the leading scientists to accept my published works on Cosmic Rays is a direct reflection on the University, which may affect the enrollment. In other words, they have dollars where their brains should be.

"Actually, the failure is theirs, not mine. If the Faculty had extended me their support as they have to certain others I need not name here, the leading scientists, Eisendrath, Voltiva, and Stanislov, would hardly have dared to turn 'thumbs down' so vindictively on my theory. But when they found I had no local support they went the limit, literally tearing the house down and throwing it out of the window."

"But, Dr. Howell," the Dean's voice was appeasing, "we do not want you to feel this way about it. Of course I cannot deny that the publication of your theory had a great deal to do with present conditions here. Natural-

ly, the famed men you have named cannot defend something which discards all present theories and substitutes a new plan, using mere fragments of others.

"Your theory of the Nuclear Hypothesis, and especially that part of it which deals with its instability and lack of cohesion when small unbalanced forces are introduced, cannot be accepted for obvious reasons. Your claims are utterly ridiculous on their face. Why, the Council of Science have found it impossible to accept all of your formulas as being mathematically correct. As a mere cog in the scientific machine, or if you rather,—as an individual,—you are presumptuous to try to prove to this learned body that our self-sustaining relativity, our inter-planetary relationship, can be even shaken by the diversion of a small fraction of Cosmic Energy to human needs."

"Yes," Dr. Howell's voice was calm, even in the face of this bitter indictment, "I remember the old saw, 'Prophets without honor,' etc., but I am not seeking the glory of achievement. I do not wish to take the laurels others have earned. I merely wish to prevent the Universal Cataclysm which must follow the use of even a few of the Cosmic Rays for power purposes. Nature has use for all of them, or they would never have been created."

"But, Dr. Howell! Industry *must* have new sources of energy! Power is needed for mills and factories. We cannot continue indefinitely with the present economic set-up. Cosmic Energy will supply the cheapest power ever known, and it must be harnessed. And no one,—yourself excepted,—has yet found anything to indicate that its use will disrupt the Universe."

"Industrial progress represents but

one phase of life, Dr. Furner," said Howell, earnestly, "but at present everything is being sacrificed to the tinsel god, Production. And the present motto of production engineers seems to be, 'more and greater profits.'"

"Your ideas are too socialistic for this day and age, Doctor," Furner's tone was withering. "No one has time to waste proving *your* theory,—there's no percentage in that! The profit lies in the other direction, to make this Cosmic Ray generator work successfully," Furner became increasingly sarcastic. "Perhaps your real reason for publicly propounding this fallacious idea is to save your own life,—if worst comes to worst. You should not let fear dominate you."

"I am sorry, Dr. Furner, that you misconstrue my intentions. But, really, I fully realize the fact that my own life is not of great moment in this world, or perhaps in any other. And neither is the life of any other single individual,—even yours," he concluded, with a slow smile.

"Well, I must admit that just at this time my fear of great danger from the cause you mention is not great," the tension had relaxed, and Dr. Furner arose to take his departure.

"Perhaps,—and then again, perhaps not," said Dr. Howell, enigmatically.

"Well, Alan," Dr. Howell turned to Winters as the outer door closed, "it looks like the sidewalks of Chicago for us."

"You mean—?" Winters questioned.

"Yes, just that. There is no doubt that you will not be asked to come back next year. You know a change in the head of a Department usually means a change all the way down the line. As for myself, I am rather glad

to be able to leave this industrially subsidized group of so-called educators for more pleasant fields. Of course I do not like the intimation that I am suffering a mental lapse,—that my mind has failed me. I feel that remark by the Dean was uncalled for."

"But you will spend the summer in the North?" Alan might have admitted that he was more interested in Mary Howell than in either work or world cataclysms.

Dr. Howell laughed: "Of course, Mary has planned for the summer vacation and we must not disappoint her. But at the same time I have some plans,—that is if you care to work with me in my laboratory there. The General Power Company plan to have their Cosmic Ray generator in operation by fall, and I have a feeling that soon after they start all will not be well with the world."

"Why, I'll be glad to help you out, Doctor," Alan was eager at this new chance.

"Thanks, Alan. There is much to be done, and we must have our work completed before the generator is placed in operation,—if we intend to survive. I am very much afraid, that after all, I am more interested in living than in protecting the world, or in saving it from destruction."

ALAN had been impressed with the serious words of Dr. Howell, but now, after a summer of hard work intermingled with doubts, he sometimes questioned the wisdom of the scientist. And Mary Howell's present doubt of her father's sanity was a blow which left him sick at heart. But his loyalty prevailed and he elected to stay until the finish.

Labor Day came and the World awoke, rubbed its sleepy eyes to a

sudden realization that this was to be the Day of Days in Science. For at twelve o'clock noon, the President of the Nation would speak a few words of praise for those scientists who had made this thing possible, then press the magic button which would officially place in operation the huge Cosmic Ray generator at Niagara Falls. Vast gatherings of people were scheduled where loud speaker systems could be used to carry the messages of the "great ones" to the gaping populace. Truly, this must be made a day long to be remembered as another great milestone of economic progress.

Though celebrations were the order of the day, the four people composing the little group on the Crawling Stone, perhaps alone of all those in the entire world, sat waiting tensely for the coming of the zero hour of noon. Dr. Howell had returned only the day before, defeated and a self-confessed failure. The learned Council of Science had considered his figures briefly,—and turned them down cold. But in spite of all, the scientist appeared relieved; the mental strain had gone and in its place was an outwardly calm acceptance of this bitter decree of the fickle Goddess of Fate.

"But you haven't told us about your trip, Frank," Mrs. Howell sought to break the growing ominous silence.

"There isn't much to tell, Eleanor," replied Dr. Howell. "Nothing happened outside of my visit to the Council. They received me pleasantly enough and listened to my statement of unpublished facts, the results of this summer's work. I just left my calculations and the formulas I used, there with them, and later they notified me that further consideration of the matter was useless."

"Did you see Dean Furner?"

"No, he didn't come to the Council

meeting. He really isn't a scientist, but a good business man who has strayed too far from his proper sphere. I will admit, though, that science has developed a business complex within recent years.

"They cannot, or will not, believe that the earth is like the armature of a gigantic, alternating current motor, which must be kept in phase with the driving force, in this instance, the Cosmic Ray. No, they prefer harnessing the Ray, even though it throws the whole machine out of time."

"But what *will* happen, Frank?"

"I can only say: I don't know exactly. Maybe anything at all. But I am still sure that something will happen—listen! The President has finished speaking!"

"There—exactly twelve o'clock! Hear that hum?"

"What is it, Dad?" Mary asked.

"It is the generator at Niagara," replied Dr. Howell. "It sounds somewhat like a huge alternator, doesn't it?"

"I think the tone is beautiful, Dad."

"Yes,—it is the music of the Universe, of Creation. It could hardly be otherwise than musical. There is no discord in Nature, except when the crude hand of man supplies it."

"How long must we wait, Doctor?" asked Alan.

"We should know more to-morrow, but above all things don't leave the island," Dr. Howell warned.

BUT the warning was destined to go unheeded, for the morrow never came. And a news flash late that afternoon spelled 'Doom,' to the world. Like a thunder bolt out of a blue sky it came to strike terror into the hearts of the listeners.

"Stand by all stations!" the words of the announcer broke through a

musical program given in honor of the opening of the new power plant at Niagara. "Warning—to all citizens of America and the world!

"The Naval Observatory has issued a warning of impending calamity; the earth is slowing down at a rate which will bring it to a complete stop within a few hours! The exact nature of the disturbance has not been discovered, but all persons are urged as a matter of self-preservation to be on the lookout for serious trouble!"

"The giant Cosmic Ray generator at Niagara Falls has been stopped as a precautionary measure. Stand by for further announcements which will be given you in the interest of public safety as fast as we receive them!"

"Alan! Dad!" Mary called, as she ran at top speed toward the laboratory, where the two men had gone for final tests of the machines.

The door was open and she entered: "Dad! Did you hear the news?"

"Eh, oh, yes. What news?" Dr. Howell's words were not wholly convincing.

"Why, Dad! The news about the earth slowing down!"

"Yes, Mary, we heard it—and expected something like that to happen. But we didn't want to alarm you. Tell Mother not to worry."

"But, Dad, what will happen next?"

"Well, we are prepared for several things. It may even be that the rotational speed of the earth will increase to normal now that the generator has been stopped. A great deal depends on the amount of the speed already lost. If it exceeds ten per cent allowable slippage, as in a normal motor, then we may never regain our correct position in the heavens.

"There is also a very good chance that the earth will fly out of its orbit and become a comet, burning up as it

A.M.S.

flies wildly out into the distant corners of the universe. But we may not even last that long—."

"But, Dad! Isn't there something you can do,—anything?"

"Now Mary! Please be calm. I tried to do a number of things, but the world stopped me before I even got a good start. Of course I have taken steps to protect those who are here on the island, but I can't even promise that definitely,—listen,—the radio!"—

"News Flash! Stand by!—Word has reached us from the Observatory at Annapolis that the earth is slowing down at an increasing rate. Astronomers report signs of disturbances of an interplanetary nature.

"The President has asked that all citizens remain calm in the face of the present catastrophe. There appears to be little to fear at present. Stand by for later announcement!"

"Here, we are perhaps better prepared for this to happen than in any other place in the world," Dr. Howell stated, calmly. "To-night, when night does come, we must stay here together. I have instruments here which are not duplicated in even the laboratories of the General Power Company. True, my equipment is too weak to accomplish much, but at least we can try."

HOURS later the sun, a great red ball of fire, sank slowly below the western horizon, seeming loath to leave a world it had served so long and faithfully. And the horror of that long night was never forgotten by those who lived on the Island of the Crawling Stone.

Perhaps days later, or possibly only hours, the survivors never knew, the radio again blared forth: "Stand by! All the world!"

"Word has come from the observa-

tory that the disturbance in the heavens has lessened, and the positions of the known stars now appear about normal. The speed of the earth is much slower and on the side of the earth where the sun is now shining the heat is reported to be intense, causing much suffering. The President asks your continued faith in the efforts our scientists are making, which will undoubtedly result soon in normal days and nights. He also suggests that according to the clocks of the Nation, business be taken up as usual, merely as a civic—"

But the words were never spoken. A terrific tremor shook the earth, and a wave of water swept over the island. The Crawling Stone seemed grasped in the hands of a Colossus, who whirled it slithering across the face of the earth after the manner of a bowling ball. A cracking jar shook the laboratory, while the foundations seemed as though they would tear asunder. And after it, there was a terrible, all consuming silence, like some dreadful nightmare.

Stunned by the shock and horror of it all, but strangely, still seated as before, the four looked and waited. Not daring to move lest the slightest movement upset this strange new world, seen seemingly as a horrible nightmare, they could only wait in silence for an end to it all.

"Mary! Are you all right?" Alan, the first to recover, shouted. But no sound of words came forth.

Surprised, he tried again, but again no sound could be heard. With an awful sensation of futility he stared at Mary, as she seemed to watch his lips, failing utterly to grasp the frightful significance of his failure to speak.

"Alan!" she called, but no one heard. Her eyes opened in terror, and her lips formed a scream,—but a dead

silence was the only result. Her face paled at the horror of it all.

It was all too hideous—the world had gone topsy-turvy. A dread silence had descended, a silence so absolute that noise could not even be imagined. It was a vast and all encompassing silence which left an unfillable void; life was a horrible nightmare.

WITH a shuddering fear in his heart Alan sprang to his feet, though Dr. Howell tried in vain to warn him of impending calamity. But too late, and Alan's body struck the ceiling a terrific soundless blow. Even the forces of gravity had been dissolved into thin air along with the power of human communication.

Plastered against the ceiling and facing downward, Alan forced a wry grin, although the shock had nearly knocked him out.

"Turn over and push yourself downward—easy," Dr. Howell's first attempt at speech resulted in silence. "Oh, damn," he thought, with professorial dignity.

With exaggerated lip motions he at last succeeded in indicating his desires to Alan, who nodded, and turned over easily. A light push sent him down to the floor.

"Gosh," he started, and then realized that he could not even hear his own voice. Sound and gravity had gone the way of all earthly things as he had known them. But Dr. Howell came to the rescue with pencil and paper.

"Doctor," he wrote, "what has happened?"

"The destruction of all forces of the Universe appears to have been absolute. Gravity, sound, and all rays with the single exception of light, and that is very dim as you will note, seem to have been wiped out completely. The

chances are that most of these things however, will come back shortly, so if you feel inclined to float around the room I would suggest that you do it now. You may never get another chance.

"However, the earth has stopped rotating completely, and probably now hangs in space, unless some other force has already begun to act upon it. We are very lucky that the sun is on the other side of the earth, as otherwise we would burn up. It will get very cold here, and we must prepare for that," he concluded.

Alan started for the door, but Dr. Howell was too quick for him, taking a jump across the room, which jump ended in a flying tackle. Shaking his head violently, he wrote rapidly: "Do not leave the room, you could easily float away in space and become lost," a horrible thought, but true enough.

"How about the people living around us? Are they in danger of floating away?" Alan asked by way of the ever necessary paper.

"Yes," replied Howell on the paper. "I imagine millions have been killed in the world-wide collapse. Perhaps thousands are now floating around in the void. If they leave the earth's atmosphere they will die for lack of air, and if they do not leave it, but continue to float about indefinitely they will, of course, die for lack of the essentials,—water and food."

"But what keeps this building on the earth?" Mary wrote.

"The foundation is set in the ground and the frame work has been bolted to it," replied Dr. Howell. "And I suppose you are wondering just why the air has not also left and floated away. Well, the air is being held here by molecular cohesion, a force supposed to be related to gravity, but

which has no relation whatever to true gravitational forces. The air has lightened considerably but not enough to seriously affect our respiration.

"But we must all rest now, if possible. We dare not leave here to get food and water until some gravity returns, if it ever does come back. You can take your choice for sleeping. Try the floor first, but if you don't like that you can sleep on the ceiling. There is some danger in sleeping above the floor, for when gravity returns it may do so suddenly, which would give you a bad fall."

It was a strange and never to be forgotten period of rest for these four. It could not be called a night, for night seemed now a permanent thing, awful in its black intensity. No stars shone in the cloudless sky, and the dim twilight of a normal night had given away to an apparently absolute nothingness. Even the beam from a powerful flashlight which Alan directed through the window was absorbed within the space of a few feet.

Yet the absolute comfort of that rest was unbelievable. Freed of gravitational forces, even the hard floor was queerly soft, for they had some difficulty in forcing their bodies into contact with it. Alan, forgetting for the moment, that all objects were affected alike, attempted to force himself downward by a swift push on the table. The results were disastrous, for the table sped swiftly to the ceiling, from which it was recovered only with great difficulty.

But the rest time ended at last, and, much refreshed, they arose to find that the earth's gravity had indeed partially returned, though their steps were lightly taken. Sounds were also heard, and by talking loudly and distinctly they found that they could communicate without the aid of writing.

A dim twilight replaced the terrible blackness of a few hours before, but an intense cold had settled around them.

"Dad," asked Mary, shivering, "will this cold stay here always?"

"That is hard to say," replied Dr. Howell, gravely, "but I have reasons for thinking that it will stay until the sun comes up to warm the earth. Your guess is as good as mine as to just when that will happen."

"But, Frank," said Mrs. Howell, "I thought you told me you had a ray generator which would set the earth to spinning again."

"Yes, that is true. I have such a machine, but it is small and maybe too weak for the purpose. I had intended to use it as a demonstrator to show how this disruptive force could be overcome, and then have a large one built."

"Dr. Howell! Doctor! Come out and look, quick!" Alan interrupted. He had gone outside with the intention of securing food from the house.

"Look, the island has moved! We're not on an island any more,—it's part of the mainland!"

IT was true, the jarring stop of the earth had shifted the Crawling Stone bodily across the lake and into the eastern shore. It was now a part of the mainland. Carefully they made their way across the jagged peak marking the place where the fusion of these two bodies had occurred. But no signs of life were apparent, and they returned again to hold council and plan for an unknown future. For this was to be a battle for survival against strange new elements of Nature. The fit alone might live.

Hours of agony and suffering followed,—hours which lengthened into days, and days which lengthened in-

to weeks and months. Afraid to separate lest some new cataclysm part them forever, they explored the surrounding country in ever widening circles, hoping to find that they were not alone in this world of semi-darkness, and a cold which hourly grew more intense.

Yet everything in a once familiar territory had changed; old landmarks had disappeared, and many of the summer houses had apparently vanished into thin air. And those that were left, they ransacked of food and stores, for this was a struggle for existence, a struggle which recognized no property rights. Laws of a once-powerful government no longer existed for them, and they took what came to hand.

During his spare time at home, Dr. Howell fussed with his wave generator, ever seeking the fundamental wave length of the earth, and hoping that his super-imposed wave would again start the stalled motor which was the earth. With a powerful heterodyned beat-note he might yet succeed, for in that pathway alone lay safety and life for his little group.

Time he computed with his chronometer, even though time was no more, a thing which was and was not, since there was nothing for comparison. Even the stars stood still, while a new moon hung dimly just above the western horizon, shedding a blurred light over the desolate landscape.

Fortunate indeed, they were, that Dr. Howell had thought to install his own light-plant for power, yet the drains on his meager supply of fuel had been heavy. Even the confiscation of all the fuel they had found in the surrounding country had scarcely increased his reserve supply. But the steady radiations of energy must be continued until all hope was gone.

The arctic cold increased to a point which was well nigh unendurable, though fortunately no snow fell to add to their distress. The waters of Turtle Lake froze to the bottom, and great cracks made walking on the ice dangerous. Yet no record of the temperature was possible, since the cold had already gone lower than the lowest point on any available thermometer,—and no end was in sight.

Then, suddenly, without warning, they had their first word from the outer world. Dr. Howell had stopped his wave-generator to make slight changes, and Alan paused a moment to idly twirl the dials of the radio. He expected nothing, but the habit of dial turning brought surprising results.

“—calling all stations! N7XA calling all stations! Please stand by for important message to any listener! This station has been unable to operate until to-day, virtually since the earth stopped some time back, because of a strong interference wave shown to be set up somewhere west.

“Because we may be stopped by the same cause at any moment, will any listener try to communicate with us? Virtually the entire population of North America has been wiped out, and from previous reports we believe the entire eastern hemisphere has been burned to a crisp, destroying all signs of life.

“We believe here that there is practically no one left in North America except ourselves. There are about a hundred of us left, and we cannot be sure how long we can continue to exist. The edge of the sun shows slightly above the eastern horizon, but the cold here is terrible, our last reading was taken at one hundred and ten degrees below zero.

“If Dr. Howell, who we remember, prophesied this calamity, is still liv-

ing will he please try and get in touch with us? We are now signing off and will continue to listen as long as we can on three channels, twenty-five meters, one hundred meters, and two hundred and fifty meters. N7XA signing off."

The horror of this moment struck the listeners dumb with amazement. Not more than one hundred people still living of the millions who had once inhabited the earth. Wiped out in almost a single moment by a scientific mistake. It was a blow from which the earth would never recover!

"Call Mary and her Mother, will you please, Alan? Tell them what we have heard! This is more terrible than I had thought. I am going to try to communicate with N7XA in code."

"I can impose a code message on my wave," Dr. Howell continued. "It may be that we can reach them with that, since they mention it as an interfering wave."

SILENCELY they stood by while Dr. Howell spelled out his message slowly and precisely: "Calling N7XA! Howell calling. Heard your message. Interfering wave is mine. Am trying to strike the beat note and set earth in motion. Answer—signing off!"

"Hello, Dr. Howell," the answer came by phone. "We are all glad to hear that you are alive. You are getting results. The sun is rising higher very slowly but in the space of a hundred hours we can notice changes. Are you having trouble with time? Our telechron clocks have all stopped, and we must rely on our watches. We have our own power plant here, everything else is off.

"You probably have not heard but practically all the buildings here have collapsed, killing outright most of those living in the cities. We saw hun-

dreds of de-gravitated human bodies pass our studio, swept seaward by a strong west wind. Probably hundreds of thousands were swept to their death in the sea in this way. If any were left on land they may be dead now from starvation or freezing. We will listen again for you twenty-four hours later. Good-by, Dr. Howell and party!"

The wave generator again took up its task of righting a disordered world, and, except for the daily talk with N7XA, those living on what had once been the Crawling Stone Island stuck to their work. And success did seem assured, for the reports from the eastern radio station were encouraging. Too late they realized the vital flaw in Dr. Howell's plan, for one more message was destined to be the last ever received.

"Hello, Dr. Howell! Hello, Dr. Howell! Can you hear us? The sun is getting too hot for us, and we are leaving by auto at once. We will head west and try to keep ahead of the sun. We do not now believe that you can increase the speed of the earth's rotation at a fast enough rate to prevent burning the American Continent to a crisp. Answer. Signing off."

"We are nearly out of fuel for our power plant," Dr. Howell spelled the words slowly out in code. "We cannot continue work for more than a few periods longer. Suggest that you come west and join us here. Good-by. Signing off."

"Well, that lets us out," sighed Dr. Howell. "I have learned that there are some things which can't be done. I believe that this is one of them."

He turned the switch on the power control panel and the hum of the generator died away, never to be heard again on the earth. Was this then, the end of all things? Yet the edge of the slowly rising sun appeared above the

horizon,—the breaking of a new day.

It was Mary Howell who first spied the tall gaunt figure approaching silently and swiftly from the direction of the rising sun.

"Alan! Dad! Mother!" she called. "Some one is coming! There—see him? Why—it looks like the Indian!"

"Do you mean old Chief 'Eagle Eye'?" Alan asked.

"Yes,—why, it is he!"

"Hello—how!" he saluted them as he came closer. "White man still here. Good—Indian like!" He seemed overjoyed at seeing them.

"Hello Chief," and they surrounded him like children.

"Where were you all this time?" asked Dr. Howell, at the first opportunity.

"Hump, up," he pointed skyward. "Me go up—wind blow me away, then back. Lose um squaw—go find,—I be back," and he walked away.

"Dad, do you think he will find her?" Mary asked. "Poor fellow," she added.

THE sun had risen to a position in the heavens normally two hours high, when the Indian returned with his squaw. Yet days had passed, and the frozen earth had thawed to take on new life. The waters of Turtle Lake shimmered in the sunlight, adding a promise to this new day.

"How did you find her, Chief?" asked Alan.

"Easy,—she stay home,—Now I go hunt."

"But what are you going to hunt, Chief," asked Dr. Howell. "I haven't seen a single animal since September, whenever that was. I think they have all frozen to death."

"No, no!" the Indian insisted. "Sun up—get warm—fish thaw out in lake.

Animals come soon. We plant garden now, you help?"

* * *

"Sun stop there," the Chief told them one day, pointing to a spot in the eastern heavens. "Always warm—plenty warm."

"Well, maybe," Dr. Howell was skeptical. "But if the sun doesn't stop there it will soon be too warm. Anyway, we had better keep after this garden,—look, the weeds are coming up already."

But it was not destined to be that easy of accomplishment, for the permanent sunlight seemed to have a strange effect on growing things. Vegetation unknown in the north had grown up rapidly. Strange new fruits appeared on the trees and shrubs, ripening rapidly in the sun. It seemed to be a new earth, and a new heaven.

"Hmmp,—never mind weeds," Chief Eagle Eye gave up, "Too much work—no do. Eat plenty fruit—never mind garden."

The former world they had known was forgotten, and with a stationary sun, the hours merged into one. Time had stopped, and the growth of wild food left nothing to be desired. Yet the Indian was ill at ease.

"You and Alan,—married?" he asked Mary, suddenly one day, in the presence of the others.

"No—not yet," Mary blushed.

"Hmmp,—old Indian custom,—get married. Heap big dance—big time." A smile passed over his features.

And so it was agreed.

Time passed, and others from the east came, forming now a colony of kindred souls, the last of their kind. Time was Eternal, and Death no longer had a part to play on earth. A New Heaven and a New Earth had replaced the old and Time was no more.

In the Realm of Books

By C. A. BRANDT

A Cinema Phrophecy

After a brief stay at one of the big screeneries, one of the most fascinating films I ever saw, left New York, to return probably sadly cut, to the lesser talkie houses. For once, the Critics of the various Metropolitan Dailies were pretty well unanimous in their praise of:

THINGS TO COME. By Herbert G. Wells.

The film follows the scenario (reviewed in a previous issue) quite closely, and by not trying to improve upon the original idea, Alexander Korda has created a truly magnificent film. It is lavishly produced, in the Grand Manner, of course not in the U. S. but in Great Britain. It shows a city of the Future—triple deck Highways—skyscrapers and apartment houses built of glass, etc., etc. It shows the life of the future, created, protected and governed by science. We are shown glimpses of a better and saner world. Greed and Chaos and Depressions are things of the Past. Organic ailments are *non est* and robust splendid health is enjoyed by everybody. Work is reduced to two hours per day. The rest of the time is taken up in cultural pursuits and health giving sports, for which all men and women are trained from earliest childhood.

"Things to Come" is Movie Magic at its best. Go and see it if you have the chance.

Another Film (in book form)

THE MAN WHO COULD WORK MIRACLES. A Scenario by H. G. Wells. Published by the Macmillan Co., 60 5th Ave., New York City.

Mr. Wells apparently has gone in for scenarios. The first one: "Things to Come" made fairly good reading in sports, but "The Man Who Could Work Miracles" is much better—as a scenario:

It seems that the Guardian Spirits of the Universe have an argument as to the uselessness of the Human Animal. One of them contends that mankind is so utterly useless and silly that it should be eliminated. The second Spirit claims that mankind appears ridiculous only, because it lacks the necessary power. They settle the argument by endowing a veritable non-entity, a small

clerk in a small dry goods shop, with the power to perform any and all miracles. Becoming more and more confused the poor fish performs miracle after miracle, but each performing increases his troubles, until thoroughly exasperated he wishes himself free of his miracle working power.

The book is quite amusing but I doubt, if it will ever be seen on the screen.

Adventure in Cambodia

THE VANISHING IDOL. By George Gibbs. Published by D. Appleton-Century Co., 35 West 32nd St., N. Y. City. 244 pages. \$2.00.

This is another Version of the legendary Emerald Buddha, which figures with fair regularity in mystery novels of the Far East. This time the story begins in Angkor, ancient Capital of Cambodia. We meet a party of tourists, Americans all—a lawyer, a movie star, her leading man, a wealthy oil widow and her daughter, with whom Kendall the lawyer is in love. This party is crashed by a Colonel Fonteney an alleged archeologist, who fools Kendall into helping him steal above mentioned Emerald Buddha. In spite of the frantic efforts of the enraged priesthood the priceless relic is not found. The spurious archeologist, who in reality is an international crook, blackmails the oil-widow into helping him in smuggling the stolen idol into Bangkok. The entire party, Buddha included, gets safely aboard the steamer, but through the clever detective work of two East Indian Secret operators, the idol is recovered, Fonteney paying for his crime with his life.

The book makes pleasant reading.

A Good Imaginative Novel

WOMEN ALIVE. By Susan Ertz. Published by D. Appleton Century Co., 35 West 32nd St., N. Y. City. 219 pages. \$2.00.

According to Miss Ertz, it is "up to" Woman in general to end war and as Man (all munition, armament and war material makers are men) is very unwilling or too greedy or too stupid to stop this foolish waste of unthinkably large sums I think Miss Ertz is right.

"Woman Alive" is a peculiar yet a very remarkable book. It transports us into the

London of 1985. The world has enjoyed 35 years of peace, interrupted by a war which lasted only 20 days. This brief war however had dire but entirely unforeseen consequences.

One of the warring nations has developed a gas against which there was no protection whatever, consequently the loss of life was frightful. Then came the aftermath: From the bodies of the gas-killed victims a disease developed which was absolutely fatal to women.

The disease sweeps the world, killing off all the women of all ages leaving the world to the men. Hopelessness reigns supreme in this futureless world, and the men resign themselves to the inevitable. Science is helpless. Then comes the last ray of hope: England announces that they have found one live woman. A Miracle. One woman was immune against the disease. It seems that this miraculous female some years ago, disgusted with life through a love affair with a thoroughly worthless male, offered herself as a subject to the experiments of a doctor-scientist, who was working on a universal serum, which would give immunity against every disease.

The entire future of the world rests upon this woman, who is of sturdy peasant stock and has a mind of her own. She vows that she will devote her life to the prevention and abolishing of war, and having the world at her mercy she taboo's everything that could be interpreted as warlike activity or leading to a possible conflict. She imposes her will upon the statesmen of the world, and then she proceeds to continue the human race by marrying a very fine young fellow. (Let's hope that all her children will be girls).

The book moves along at high speed, carrying the reader along at such a pace, that he has no time to view a few minor weak points. On the whole, an enjoyable book. I recommend it.

Is Interplanetary Communication possible?

We have printed a great many stories about trips to the moon, the inner planets, the Asteroids, and the outer planets. Even the unthinkably vast distances separating this galaxy from the next nearest one have not been a barrier to some of our authors, who have the heroes of their stories use marvelous vehicles developing speeds of many times that of light in order to reach their far distant goals. Almost all of these imaginary vehicles used in these stories were of the "Rocket" type, and I firmly be-

lieve with Professor A. M. Low that interplanetary travel is not wildly impossible but merely at the moment somewhat beyond our knowledge.

**Professor Low wrote the preface to:
ROCKETS THROUGH SPACE.** By P. E. Cleator. Published by Simon & Schuster, 386 4th Ave., N. Y. City. 209 pages. \$2.50.

"Rockets through Space" tells us all about what has been accomplished so far to make interplanetary communication possible. Though it is essentially a scientific book, it is nevertheless comprehensible to all, as it is written in a very simple manner. As the matter stands today it is chiefly a question of fuel and fuel only. All other difficulties seem to be more or less negligible. The available fuels which are capable of developing the utmost in power—Oxygen and Gasoline are still far too inefficient to allow a rocket to reach the required velocity of escape which for this planet is about 7 miles per second, in order to overcome the gravitational pull of the earth. This speed must be attained gradually, as otherwise the friction would quickly burn up the vehicle. Furthermore ways and means must be found to overcome the terrific handicap of weight. With our present limited knowledge of fuels we find that it would take 219 tons of fuel to lift one ton of weight, and this is a proportion not at all in favor of an immediate solution of the problem of space travel. All the familiar drawbacks are discussed in the book, such as acceleration on gravitational attraction of other planets, the danger of friction the menace of collisions in space with meteors, etc., and the present state of science which already is well capable of minimizing all these dangers once thought unsurmountable.

The book contains many interesting illustrations as well as charts and diagrams showing how a course must be plotted by the space traveler of the future in order to reach the moon and other heavenly bodies. The only thing which still remains quite hazy is the question of a return trip, but that probably will be the worry of generations far in the future.

The book also tells of the widespread interest in rocket experiments in various countries and the forming of interplanetary societies, which are all working towards the perfection of the Rocket as a vehicle of escape from fetters of the earth. Happy Landing. "Rockets through Space" is sincerely recommended to all those who take a delight in "Escape" literature (Amazing Stories to you.)

DISCUSSIONS

In this department we shall discuss every month topics of interest to readers. The editors invite correspondence on all subjects directly or indirectly related to the stories appearing in this magazine.

A Most Amusing Letter, Not Really Scolding Editor, AMAZING STORIES:

I staggered drunkenly and leaned up against the magazine store window for support. No, I wasn't suffering from hallucinations or disillusionments—there it was, the June issue of *AMAZING*. I immediately rushed in and purchased it. The reason for my surprise was the date—only March 27. I believe this establishes a record of some sort—imagine it, March 27, almost a week ahead of time. I wish *AMAZING* would arrive at the newsstands early every issue.

The stories as usual were all excellent, outstanding or what have you. As for the star story in this issue I choose "The Isle of Juvenescence." Although the idea isn't exactly original, Olsen's method of exchanging brains is. Switching brains by means of the fourth dimension—that is original.

Closely following comes "Luvium Under the Sand." Any reader who complains about the lack of action and human interest in the magazine after reading this tale should be disintegrated or haunted by some dimensional monstrosities.

"When the Meteor Struck" was an interesting short, but I have a complaint to make against this yarn. Excerpted from page 77, line 4. "Of major planets, this system has eight in addition to numerous satellites—" I credit Mr. Burt with more intelligence than he displays in this story. In fact I'm sure he unintentionally made this obvious mistake. Possibly it is the printer's fault—but someone is to blame. A juvenile reader who doesn't have any knowledge of solar system, would be under the impression, after reading this tale, that there are only eight planets. I am sure it was an unintentional mistake.

"The Sword of Akalah"—usual stuff. Bad peoples will not believe what poor hero tells them, thus sending him to the "bug house." The excellent writing made up for the hackneyed plot however. Deserves and needs a sequel.

Is my face red? Among the letters in this month's discussions is one from Willis Conover, Jr., who protests against readers using the term "mag." In the same issue is a let-

ter from yours truly using the aforementioned term.

Taking the cover into consideration; the scene and colors—very good. Who says Morey isn't improving? His inside illustration for "The Sword of Akalah" was a masterpiece. It was drawn perfectly to the smallest detail.

I ask you Dr. Sloane, how would you feel if the printer made a mistake and wrote B. O'Connor Slane Ph. D. editor? Well, that is exactly how Wm. Lemkin feels, for in glaring type on the cover is the words "Beyond the Stratosphere" by William Lemke, Ph. D. There is also a trivial mistake in the spelling of A. R. McKenzie's name.

I hope you do not take these criticisms as those of an ill-natured crank, for they are not meant to be so. After all if no one ever pointed out your mistakes, the magazine would never improve.

In closing, I express the desire to see more of Keller's narratives among the pages of *AMAZING STORIES*.

Yours sincerely,

ROBERT A. MADLE,
333 E. Belgrade St.,
Philadelphia, Penna.

(The editor is not sure whether Pluto is a really major planet. It is very probable that more planets will be discovered in time. As far as we are concerned, the term "mag" for *AMAZING STORIES* is more than allowable—we like it, and shall hope to see it often. You have noticed the term "Our Magazine" used by writers of letters. This too we like. Thanks for your criticisms.)

A Nice Gossipy Letter, Principally About the June Issue

Editor, AMAZING STORIES:

As a starter about the June issue, I'll take the cover, this cover is better than the April cover, and I thought the April cover was a sight for sore eyes, if Morey keeps this up, he'll be getting somewhere. However, there was one thing I did not like about the illustration, that was the buildings, why, oh why does Morey have the same buildings on almost every one of his

drawings. Outside of that, the drawing was good. While not reading the serial as yet, I look forward with eager anticipation to the next issue. The name Lemkin, speaks for itself. "The Isle of Juvenescence" by Bob Olsen, while not the best in the issue, was above average. "When the Meteor Struck," was-oh-fair enough. "The Sword of Akalah" was a good story. How about a sequel? Now I'll come to the best story of the issue, "Luvium Under the Sand." No doubt this much needed sequel was awaited by many, and I trust that they were not disappointed. Of course, the rating was very good.

The best inside illustration was the one for "The Sword of Akalah." The rest were not as good.

When is the next Quarterly coming out (if ever)? If it does come out, please don't make it a reprint edition.

Although the small size AMAZING STORIES is good, I would much rather (and no doubt many others would too) have a large sized AMAZING STORIES.

By the way, I have a large number of AMAZING STORIES, both monthly and quarterly, that I wish to dispose of. Persons interested will please send a list of the ones they need, I will quote prices.

JOHN V. BALTADONIS,
1700 Frankford Ave.,
Philadelphia, Penna.

(We are not sure when the Quarterly will come out. It is quite irregular as you know. The preference in the matter of large or small size of the magazine seems fairly evenly divided.—EDITOR.)

An Excellent and Critical Letter, Very Well Thought Out. It Is All the Better For Not Being All Praise. And Wild Bill Appears In It.

Editor, AMAZING STORIES:

After noting the improvement of such minor matters as paper, type size and so forth in your last three issues, without any rise in actual quality, the new April issue is quite a shock. A most pleasant shock it is, indeed. Not that it is VERY good, you understand, but it is really a big improvement, and I believe in giving credit where such credit is due. The proper procedure for a fan would be, I presume, to burst into a roundel and sing hallelujah-choruses long and loudly; however, having been acquainted with AMAZING STORIES for several years now, I am not at all convinced. One swallow is not noted for making summers, you know, and there have been occasional good issues

before rearing their heads out of the desertsands of banality wherein you have been so long abiding.

This letter is, generally speaking, for commendatory purposes, so I shall graciously forget your somewhat shady past, for the moment, and dwell upon a more brightening present: the April, 1936, number.

First: Who could overlook the cover? I admit I could not; I seized the magazine eagerly, and making sure that it was the cleanest copy in the pile, bought it without bothering to look inside. Morey, your sins are forgiven! This cover is a delight to the eyes, and a credit to the spirit of science-fiction. Thanks, also, for putting the year as well as the month date on the cover; it helps a lot.

Second: The interior decorations. I have decided to stop thinking of them as illustrations (they aren't anyway—with a few exceptions) and regard them as sketches. By doing so, I can really appreciate them, for they are good pieces of sketching. An occasional drawing, such as the one for the serial and Neil R. Jones' latest, breaks up the monotony.

Third: Discussions. A number of highly amusing misprints slipped in this time, most notable of all "Sinners of Time." Wild Bill would probably agree wholeheartedly with this appellation and say that is what the story should have been called in the first place. Personally, I enjoy Mr. Fearn's efforts very much, and forgive his foibles, because he shows signs of deep thought at times. Which is more than can be said for myriad of stories you have published and which Wild Bill has let pass unscathed. Note to our Wild friend: "I entirely disapprove of what you say and will defend to the death your right to say it." (Voltaire.)

To Mr. Leety: Perhaps you were thinking of "The Human Termites" by Dr. Keller, which appeared back in 1929 in another science-fiction magazine. One does get magazines confused at times. This story I mention seems to fit your descriptions better than any I can recall in AMAZING STORIES.

To Mr. Birch: Your after death what? theme is a distinctly touchy subject and by no means a virgin field. There is still room for more, though, because we know as little about it as anything. Not only does the writer come up against religion though, when dealing with this idea, but often those who successfully evade Scylla fall into Charybdis by becoming sentimental.

Fourth: The stories themselves (the last thing the readers read). "Intelligence Undying" was very well done. One wonders though, why there were not more immortal

intelligences made. Why not one for every important branch of science. The ending was logical enough, though.

In "A Modern Comedy of Science," Mr. Nathanson has at last done what this fan has long been waiting for—written up an old, old theme without the old, old development. Our Reformer is not a madman, there is no glamorous heroine to be rescued, and best of all, the secret is not destroyed at the end of the story, nor is the Reformer killed. Bravo!

When we come to the conclusion of the serial, all I can say in praise is that part two of the "Maelstrom of Atlantis" is better than part one. Which is not saying much. At least, it comes nearer to adult fare, though, than the childish "Posi and Nega" series. Don't misunderstand me; I consider the "Posi and Nega" stories as invaluable for junior high school students who are just getting a start in their study of general science. But for AMAZING STORIES, which certainly is not printed for eleven-year-olds, (or maybe I'm mistaken; is it?) they are inexcusably misplaced. In the present effort, Mr. Skidmore has the same schoolboy and schoolgirl characters as usual, and the same juvenile style. By the way, Joane Cromwell was in love with Donald Millstein and adventure the last time we had the misfortune to meet her; I see she still likes adventure, and is consistent to her sweetheart's first name, only it is another Donald. Did the Falcon catch up with our brave (former) hero at last? Sad; inexpressibly sad! A rather amusing coincidence has made our brave Joane find her lost Donald Millstein in another two part serial, published in a rival magazine at exactly the same dates of issue. That is a coincidence, of course, for which you are not to blame. But the onus of printing "Maelstrom of Atlantis" should be guilt enough on the editorial shoulders. Ah well, to err is human and we may as well play at being divine. *In pace resquiescat!*

"Labyrinth" is quite enjoyable as a science-adventure tale, and I have always found Professor Jameson entertaining. We mustn't forget, too, that they have afforded the material for some of Morey's best covers. "The Pygmies of Phobos" was very well done, and quite unusual in places. And last but not least, the "Airwayman," while not sensational, was very readable and had a clever twist to it.

That seems to be about all for now, Mr. Editor; you know from past letters that I enjoy and admire your editorials. In reply to your question: yes, the little magazine I edited was successful in its way. No, it wasn't a school newspaper, but a publica-

tion sponsored by Co. 178 CCC at Flagstaff, Maine. It was my good fortune (or perhaps I should say misfortune) to be at the helm for the first four issues, and also to have the chair on the yearbook. The newspaper was still going the last I heard from them; my time expired in October, 1934, and only four issues had been published. We didn't make any fortune, but did clear expenses and had a little over. The experience was just enough to show me how little I knew about it all, and the more I do of that kind of work, the less I see I know about it. And to readers who will immediately ask why in h--- I don't keep quiet, seeing I admit knowing nothing, my answer is: If I knew all there is known about editing a magazine, I wouldn't be here writing letters to this editor; I'd be at the wheel of my own science-fiction magazine. Our editor invites comment, of all kinds, and as a loyal reader, I'm doing my duty and sending it on; writing just what I think, mind you, and bowing to no rules. My only aim is to be constructive and if my letters sound a little harsh, remember: "Desperate diseases require desperate remedies." (Guy Fawkes.)

Until the next time then. I'll be waiting for the new issue with the sincere hope that it will be such as will let me write a letter at least as commendatory as this, if not more

ROBERT W. LOWNDES,
Springdale, Conn.

(Quite independent of its atmosphere this letter is complimentary in the sense that it takes our magazine seriously, and we certainly are trying to keep it in the class of publications that can elicit such letters as this one. Indiscriminate praise is sometimes more disagreeable than similar abuse. You can hit back at condemnation but can do little or nothing about flattery. We wonder where "Wild Bill" got the idea of such an appellation.—EDITOR.)

Back Issues of Magazines to Dispose of Editor, AMAZING STORIES:

I have read many requests for back issues. I am writing to say that I have several numbers of different magazines. I am obliged to dispose of my collection for financial reasons. I am asking twenty cents for monthly magazines and twenty-five cents for quarterlies. I will send a list to any prospective purchaser. They go back to 1929, and up to 1935.

WILLIAM MUEH,
3285 W 42nd St.,
Cleveland, Ohio

A Friendly Letter From An English Correspondent. There Should Be No Trouble In Getting Copies Of AMAZING STORIES in England.

Editor, AMAZING STORIES:

I have been intending to write you for quite a while, but I have kept postponing the date from time to time. I have now finally plucked up sufficient courage to express my opinion upon your magazine. AMAZING STORIES is not as a few narrow-minded cranks call it "utter nonsense" and "impossible jargon," etc., that is only what they think about it. I wonder what kind of literature they themselves prefer?

From some of the letters which I have read from these people they must prefer "fairy stories."

I myself, think that it is the best book of its kind on the market.

Even although I am only sixteen, I pride myself on the fact that I have a better judgment on science books than many people many years my senior. As regards the book itself. I think it would be better reverted to its former large edition as it would give more space for more of Morey's drawings. Owing to consecutive copies being hard to obtain in England, I think it would be better to cut out serial stories, and short ones substituted.

If this letter is published in "Discussions" I have a request to make for an American correspondent of my own age interested in science.

Every success to your magazine.

DIXON HOYLE,
208 Long Lane,
Bermondsey,
London, S. E. 1,
England.

(You should have no difficulty in procuring our Magazine regularly. We have an agent in London whose address you will find at the foot of the contents page. You will, we are sure, obtain an American correspondent. Many correspondents have been obtained by our readers through the "Discussions."—EDITOR.)

This Is the Kind of Letter An Editor, Who Is Trying To Please As Many Readers As Possible Likes To Receive.

Editor, AMAZING STORIES:

Just another letter from an old fan. About two years ago, I was one of those ardent devourers of any and all science fiction. Then, for various reasons, mostly lack of funds, I stopped. Yesterday, I noticed the old, familiar title in a bookstore window, and

succumbed. I paid the necessary two bits, and three tax tokens (blast 'em!) and settled down to a good time.

The first thing I read was the editorial. Swell. Nice bits of science. Then "Beyond the Stratosphere" by Lemkin. I'll buy the next issue just to finish that. I also liked the story, "When the Meteor Struck." That kind always makes me think, and when a story does that to me, that's something! But the greatest surprise to my mind was—but it needs a new paragraph—

The advertisements!!! Boy, here's to you! At last those blooming sex ads are eliminated. You don't know how surprised nor how glad I was to see that. And after all those excuses about how an editor had to take what was given to him. Again I say, hip, hip, hurrah! for old A. S.

Your adding that section on books is a darn good idea. Another feather for your cap, Mr. Editor.

Well, in conclusion, open up your arms, A.S. and welcome back an old friend who'll stick with you now as long as you are on the market.

A. DEAN TUTTLE,
South 4th Street,
Tacoma, Wash.

(We thank you sincerely for your appreciation of AMAZING STORIES. It is about the only real science fiction magazine on the market. We can assure you that such letters as yours mean a great deal to our staff, who go to much trouble to please a good proportion of their clientele. We are sure that you are a reader of "Discussions." You will realize that the second syllable of that word expresses the nature of some of the letters we receive. We thank you for what you have written.—EDITOR.)

A Nice Letter of Criticism From An English Reader. We May Be Able To Supply You With Back Issues. There Are Dealers In Such In This City and Elsewhere.

Editor, AMAZING STORIES:

Although I've been reading science-fiction for about three years, since I was 12 years old, this is the first time I've written to any magazine. In the first place, let me compliment U.S.A. on being so far ahead of us in science-fiction. The only S.-F. (British) we get over here are the books of Wells.

However, I have some brickbats which I hope you'll take reasonably. First, how do you think Morey's weakly-colored covers can compare with the lurid, attractive covers of your competitor? Secondly, you're inside illustrations are monotonous. Why

don't you get some variety in your art work, instead of all Morey? Your present issues absolutely can't compare with your older issues.

Look at the January issue of A. S. A very good cover by Morey, six stories and illustrations by Morey, Wesso and Paul! Why can't you get one of these to help Morey out now?

By the way what happened to the Quarterly?? Don't say it's gone for good! Now a word about the December, 1935, issue. I think the no serial idea is an improvement. The best story was Miss Stone's "Fall of Mercury." "Draught of Immortality" though not science fiction, was an excellent, well written story. Is A. W. Bemal, British? Third was "Symphony of Death," I liked the author's sense of humor. "Restitution" was quite good. "Meteor Miners" was poor, the plot hackneyed.

The cover? Couldn't you have chosen a more interesting scene from: "Fall of Mercury"? I'd like to get in touch with English readers with copies for sale.

C. HAZELGROVE,
18 Foundry St.,
Brighton, England.

A Contribution From the State of Iowa

Editor, AMAZING STORIES:

I am not a reader from the Antipodes, a thirteen year old, a Britisher, but yust a back woudsmen wuth uh yen fer science fiction. (I'm considering that most pipple think that Ioway is some large cornfield with hawgs and farmers running around in a foot of mud.)

Sechin' thu dangerous glint in the Editories eyie, I shall stop browsing, browbeating, munching and pasturing (in thu above mentioned cawrnfield) TO TRY TO TRANSACT SOME BUS (pawdin' me ah jist noticed) sness concerning back numbers of AMAZING STORIES (down't crowd i ain't offering none tub sell.) Those I want to buy, beg, borry, steal, hijack, etc. are as follows;

April & May '35, Aug-Sept '35, and all others in yearly lots before Dec. '33. Name your own price just so it does not exceed the original price.

The April issue was fair, the outstanding stories in my estimation were "Labyrinth" and "Intelligence Undying." Your stories don't seem to have the same touch they had once.

My first contact with Science Fiction occurred when I was six years old and with a peculiar imagination. My mother had taken me shopping and I had wandered away, stopping finally in front of a magazine stand. The first thing to attract my at-

tention was the cover of the quarterly, Vol. I, No. 4, Fall '28, with the story "The World of the Great Ants" by Verrill. I tried to run off with it but the proprietor of the stand chased and caught me. Since then I have always DISLIKED proprietors of magazine stands. I would like to get hold of this magazine, so if anybody wishes to part with his issue for a tidy sum please notify me.

This jumble of words is already beginning to look like my father's income tax calculation, so I guess I'll have to close.

JNO CORBETT,
Iowa Falls,
Iowa.

(Your letter is so amusing that it has literally cast a spell over the Editorial Chair. At least the first part of it did, it is hard to decide what part of your letter is most pleasing—the first or the second portion. One feature you may observe, and that is the fact that our authors have a way of standing by us. This should do the work of maintaining our standard.—EDITOR.)

A Letter Which Contains A Sort of An Apology For Its Predecessor Which Was A Bit Severe

Editor, AMAZING STORIES:

After the bad let down we had over the Feb., '36, issue I must compliment you on your effort in April, '36. It showed real improvement in stories and illustrations.

Cover—Fine. Space-ship well-drawn and the machine men are sketched according to author's description. (Something new?)

Editorials are always fine.

"Intelligence Undying" by Edmond Hamilton, was a very fine story. The long wait we had must have whetted our appetites, although they should need very little to really appreciate a story by Hamilton.

Mr. Nathanson, I, figuratively speaking take my hat off to you. Your story "A Modern Comedy of Science" was aptly titled. After reading most of your stories in A.S. and other magazines I must confess I never realized that you could be so humorous. However, we live and learn. Also I congratulate you on your individuality in that the hero was hailed as a saviour instead of being damned eternally by all and sundry for trying to reform the human race and, Lord knows, we need it. A refreshing tale and one worth re-reading as it well merits by being Mr. Nathanson's best effort.

The "Professor Jameson" series of stories was well carried forward by Mr. Jones's last effort "Labyrinth." These were all good tales, from first to last, although the numeri-

cal designation of the various machine men is slightly confusing.

Mr. Editor, I know I roasted you unmercifully in my last letter and maybe you did not need to be treated so harshly, but we (I am speaking now for the many readers) should like to see A. S. a monthly again. How are the odds?

C. HOWES,
397 Davisville Ave.,
Toronto 12,
Ontario, Canada.

(There is little to be said in answer to this very friendly letter. As far as any severity in your preceding letter is concerned, this one makes up for it, and we thank you for the encouragement it gives us. We are hoping for the resumption of the Monthly issue.—EDITOR.)

A Very Special Letter From A Science Fiction League Member

Editor, AMAZING STORIES:

The cover for the April, 1936, AMAZING STORIES was very pleasing to the eyes. Morey is choosing his colors well. However, some merit is lost because Morey does not bring out the details. He seems to have splashed his brush at random, while drawing the background. Also, many important details are blurred.

The editorial was very interesting.

"Intelligence Undying" was a good story, but the plot was not absolutely original. Hamilton could have developed the plot to a greater extent. However, he did manage to "save the earth."

"A Modern Comedy of Science" was very amusing. I enjoyed it immensely. However, scientifically, it was all wet. First, the "Utopian Reformer" would not have been able to wield or even hold a stick, or any other three dimensional object. Secondly, he would have fallen straight to the center of the earth since everything passed through him; nothing could deter his fall.

But I repeat, I enjoyed the story.

"Labyrinth" is an excellent continuation of the Jameson Series. All of them are classics. I look forward to more.

"The Pygmies of Phobos" was interesting. The author certainly went out of his way to tell the main story.

"The Airwayman" was good reading, and should have had an illustration. A good drawing has a good effect upon the reading of the story.

When are you going to make AMAZING STORIES a monthly again?

You should have had some special features in the April issue concerning the 10th Anniversary of AMAZING STORIES which is

also the 10th Anniversary of a real "stf" magazine.

Here's hoping for more features, new authors, variety of artists, and a Monthly magazine.

More power to Science Fiction,

RAYMOND PEEL MARIELLA
Science Fiction League,
First Class Member No. 18,
3527 Chancellor Street,
Philadelphia, Penna.

(We are living in hope of a monthly AMAZING STORIES some time in the not too distant future. But it is still a subject of debate, so we hope for the best. One special feature of our tenth anniversary is that we are now virtually the one Science-Fiction magazine. Is not this a good "Special Feature"?—EDITOR.)

An Article Printed By Special Permission from "The Saturday Evening Post" Is Objected To

Editor, AMAZING STORIES:

I got my copy of AMAZING STORIES today and there was one terrible thing in it. I refer to the article "Nothing To It." That joke is as old as the hills and as it says at the end, copyright, 1834. I enjoyed the issue however, although I cannot see how the story "Hoffman's Widow" could be called a science-fiction story.

I have been an ardent reader since 1931 and have been trying to get back issues ever since Wonder Stories started its swap column. You ought to try it for I know several people who buy Wonder just for that column. I still need copies from 1926, '27 and '28.

My favorite author is Dr. E. E. Smith who wrote the Skylark stories which were in my opinion the best published. John W. Campbell, Jr., is almost as good and the Arcot, Morey, Wade and Fuller stories are the second best stories you have published. My other favorite authors are Harl Vincent, Neil R. Jones and David Keller. The interplanetary stories are the best by far.

It hurts to see you go bi-monthly, for I remember that "Astounding" did that before it went out of business.

E. E. PIEDMORE,
28 East Fulton Street,
Long Beach, New York.

(The date you quote was an error in proof-reading, it should have been 1934. Our stories are not necessarily invariably of the science-fiction type. The questionnaire shows that there is a lot of science to be found on the pages of AMAZING STORIES.

You must remember that its principal name is AMAZING STORIES and that "Science Fiction" comes in as a second title, not necessarily applying to everything which has been published. Your favorite author Dr. E. E. Smith is a chemist of very high standing and possesses the art of telling a good story embodying his knowledge of natural science. We have a custom of publishing all letters asking for back numbers. This we do because we are not always able to supply them from this office.—EDITOR.)

Comments At Once Amusing and Complimentary From a Careful Reader

Editor, AMAZING STORIES:

Looking back through Discussions of 1935 I find the most contradictory criticisms. I give you samples of nine pro and con. (These we omit to save space—nine abuse our magazine unmercifully and others praise it to the skies.)

Hmm—well what are we doing, Editor, descending, ascending or floating? Ascending is the right word. And if anyone cannot see that A. S. is ascending, may that person step up and receive a pair of glasses. Take notice, Mr. Pizanno of December, '35. Any-way Charley says "No more time travel and no more satirical. To say it differently, nothing but interplanetary. Well interplanetary is O. K. But, Mr. Pizanno, what if approximately two hundred other readers do want satirical and time travel, the latter especially?

A. Editor prints Time Travel and Satirical.

Pizanno quits A. S. That event has happened.

B. Editor prints no Time Travel.

200 quit A. S.

Most likely the Editor would rather have one reader quit bnying A. S. than 200—so Mr. Pizanno you should not have picked time travel as your enemy. It is too popular with readers! As for satirical put that in also.

By the way wasn't "When Time Stood Still" by Phillip J. Bartel in the February, '35 issue a dandy little story? More stories that are satirical and more time travel stories, Editor. To wind up I must express my gratitude for the little Henry J. Kostkos story in the April issue. Let's have a lot more by Kostkos. He is a writer. I am not forgetting "Earth Rehabilitated Consolidated" either. In my opinion that was A.S.'s best contribution for 1935. Keep AMAZING STORIES ascending, Editor.

JOHN CHAPMAN,
500 15th Ave. S. E.,
Minneapolis, Minn.

(It is certainly most amusing to see how opposite in ideas different readers are. It seems that what you express goes to show the impossibility of pleasing everybody. As regards comparison with other magazines, we regard that as of the least importance. Although we do not let unfavorable criticisms trouble us, we certainly enjoy such favorable ones as you express, for you appreciate the work that we are doing and the time and thought that has to be extended on it. Your arithmetical way of presenting the topics is decidedly amusing. Poor Mr. Pizzano is getting a great scolding, but good natured enough, we hope, to elicit an answer from him. We certainly shall try to follow your last exhortation and keep AMAZING STORIES rising.—EDITOR.)

It Is Hard to Please All Readers. What About Trying to Please a Well-Meaning Editor?

Dear Editor:

Phoeby, phoeby, phoeby. That is what I think of the contents of the June issue. Honestly, do you call the tripe you are printing, Science fiction? All it is is poor fiction.

Of all the stale, outworn, and hackneyed plots, the June issue's stories take the cake. They weren't even well written, much less science fiction. I guess you have gone in for strictly children's tales; they certainly aren't meant for the ardent fan.

Keep this up and you won't even come out every other month.

Hoping that you will improve, but not expecting it, I remain,

Yours truly,

MILTON B. J. HARLES,
233 Perry Street,
San Francisco, Calif.

(We have let the word "Dear" remain, although it is not generally used in the heading of letters in this department of the Magazine. You see we try to get a little comfort out of your rather savage letter. We would like to please everyone but we cannot.—EDITOR.)

About the Transference of Brains, With Reference to "The Isle of Juvenescence" in the June Issue of AMAZING STORIES

Editor, AMAZING STORIES:

The purpose of this letter is to confirm the plot of Bob Olsen's Isle of Juvenescence. A few days after I read that most ingenious story, I received this week's Science News Letter. I would like to quote a part of an article I saw in it;

"BRAIN TRANSPLANTED FROM TOAD TO FROG. The fantasy of transplanting personalities from one man to another has been realized in the world of the lower animals by the transplantation of a toad's brain into a frog's head. The frog then proceeded to behave in a partially toad-like manner."

This certainly upholds your statement, "Extravagant Fiction To-day . . . Cold Fact To-morrow."

Scientifically yours,

BEN B. BEDERSON Stf. A.,
2739 Barnes Ave.,
Bronx, N. Y.

A Naughty Schoolboy Writes Us a Good Letter

Editor, AMAZING STORIES:

That June issue wasn't bad, although it was rather a detriment to the high standards AMAZING has lately been establishing. "The Isle of Juvenescence" was good. I like all of Bob Olsen's stories. Do you remember "The Ant With a Human Soul," "The Purple Monsters," and "Peril Among the Drivers"? Those, I think, represented Bob Olsen's best stories; and especially the first.

Some readers have said that you are slipping up on the job. In my opinion, AMAZING STORIES shall always be the aristocrat of science fiction. Even in the small size magazine (which, incidentally, I like better than the larger book,) there is always a dignified air in the pages of AMAZING STORIES. Those persons who long for the good old days must remember that a magazine with a circulation of 100,000, as AMAZING was in the days of yore, can get better authors, pay them well, and thus secure more and better stories. Sometimes I wonder if science fiction shall ever be as popular as it was in 1927-31.

Please get more stories by Leslie F. Stone. Her "Fall of Mercury," though ridiculed by a few kickers, was the finest ever to emanate from her typewriter. In my opinion, her work excels that of another woman author, C. L. Moore. Someone has correctly defined Moore's stories as "dressed up fairy tales."

Looking over some of Morey's drawings of 1928-33, and comparing them with his modern drawings, one is bound to notice that they are not as good as of old. (I refer to his inside illustrations.) To my mind,

this decline of quality is due to one or both of these reasons: (1). That Morey has too much work to do, and can not put enough time and care on one drawing. (2). That the large size magazine improves Morey's style, as is the case with Wesso. Morey's covers aren't bad at all.

I don't believe that brickbats directed at an editor who is trying to improve his magazine are of any value. But maybe a few suggestions would be helpful. 1. Ask Morey to use brighter colors in his covers. The December cover, illustrating "The Fall of Mercury," was excellent. 2. Increase the number of pages rather than the size of pages. I conceal my magazines in an open notebook at school, and read them. With the big book, there is danger of detection, but the smaller one lends itself to concealment. Also, the smaller magazine looks neater when filed away in a bookcase or cabinet. 3. Don't reduce the price. 4. Try to get Wesso to illustrate one story a month. He was supreme in the bigger-sized book. 5. *Don't* lessen the pages of Discussions. Now, this is a pretty big order to fill, but if only one is carried out, I shall be happy.

25c isn't too much to charge if you give us an average of one good story per issue. And that is what you have done in three recent issues: December, February, and April. The outstanding stories were: "The Fall of Mercury," "Labyrinth," and "Intelligence Undying." I could not find an outstanding story in the new June issue; they were either mediocre or good.

I haven't much more to say, only that I wish you success with AMAZING STORIES.

DOUGLAS BLAKELY, Sec'y J.S.F.C.C.
4516 Edina Boulevard,
Minneapolis, Minn.

(What will your teacher say if he reads this letter and finds that you prefer story-reading to studying? A letter to an editor may be of interest because it criticizes him, and well thought out criticism is very valuable, or it may express approval so as to encourage and that is at least pleasant and confirms one in the path he is travelling. What you say about the June issue is not confirmed by various letters we have received expressing approval of it. Then there are limitations which affect an editor's work, and no one realizes the effect of them better than he does. But readers criticize without knowing a thing about these limitations.—EDITOR.)

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